MONTRAC Design Guide

Increasing productivity thanks to flexible and intelligent intralogistics

12/2013 issue in English

MONTRATEC - REFERENCES

MONTRAC IN USE

Antistatic and low power consumption

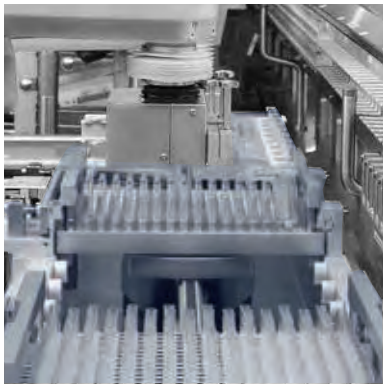
„With montratec's technology, we could customize the transport system according to our production needs, eliminating dust, reducing consumption and optimizing the entire production cycle."

Vincenzo Lioy, Managing Director, Triom

Efficient and fully automated intralogistics

"With Montrac we were able to realize several objectives at one time: we saved time, optimized control of production processes and efficiency of labor and improved our space utilization."

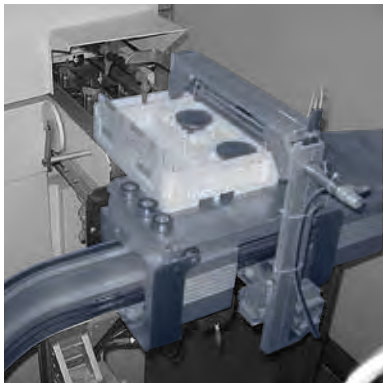
Maurizio Romagnoli, owner of Tech-Pol s.r.l.



Intralogistics for unattended clean rooms

"Based on a positive result gained in a previous project, we know we can find a suitable solution to satisfy the requirements in terms of compact dimensions, small footprint, compatibility with aseptic environments, reliability and high availability."

Thomas Otto, CEO of Vetter Pharma-Fertigung GmbH & Co. KG



Flexibility for the Future

"We are very satisfied with the result and service of montratec. We are currently planning the implementation of two more Montrac lines."

Ulrich Wilke, Production Manager of SEIKO Optical Europe Laboratory


SCHMID

montratec AG

The montratec AG with its place of business in Gerlafingen (Switzerland) is a company within the SCHMID Group and is specialized in the development, manufacturing and the marketing of the automated transport system Montrac. Montratec's service includes the consulting and engineering of customized projects, ranging from single components of the catalog to complete turnkey system solutions, including flexible control concepts.

Montrac is the most flexible, economic and reliable automation system for transport tasks within a company (intralogistics), efficient assembly automation solutions and systematic process interlinking of industrial production and logistics processes for automated manufacturing. Innovative customers from different industrial sectors (automotive, photovoltaics, plastics, medical, optics, batteries, semiconductor technology, food etc.) have benefited from the unique advantages for more than 15 years and use the Montrac system successfully around the world.

Montrac: award-winning monorail transport system

SCHMID Group

SCHMID has been inventing solutions for dynamic industrial sectors for 150 years, achieving impressive growth by successfully entering into new business fields and international markets.

The SCHMID Group covers a wide range of key technology competencies in wet processes, thermal and vacuum processes, printing, metalization, vision and inspection, laser technology as well as automation and intralogistics. Out of this wide ranged technology portfolio, SCHMID develops innovative solutions in its technology centers and turns those into tailor-made process technology for existing and new application fields.

The SCHMID Group manufactures worldwide with more than 2.000 employees in Germany, Switzerland, Taiwan, Japan, China and the USA and has numerous sales and service branch offices around the world.

www.schmid-group.com

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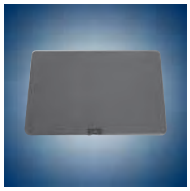
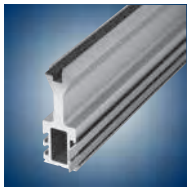
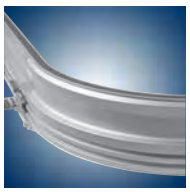
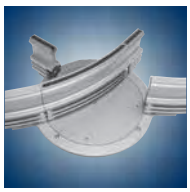
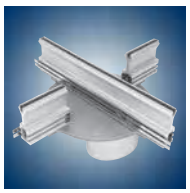
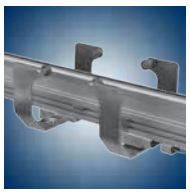
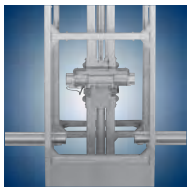













Subject to modifications

MONTRAC – THE SMART INTRALOGISTIC SYSTEM

Montrac is an intelligent automation and transport system for interlinking industrial production and logistical processes and provides total flexibility, reliability and efficiency when it comes to conveyor technology.

IN-PLANT TRANSPORT (INTRALOGISTICS)

Intralogistics and manufacturing processes are usually optimized up to the last second. Our award-winning Montrac system achieves a maximum material throughput with a minimum of cycle time and a very high system stability and guarantees a flexible expandability of the whole system.

ASSEMBLY AUTOMATION

Montrac is compact, fully modular and consists of system components.
In confined spaces or across several floors Montrac reliably and economically performs transport tasks in the assembly automation, supports production tasks and processes from batch size one in any desired diversity of variants to high-volume production.

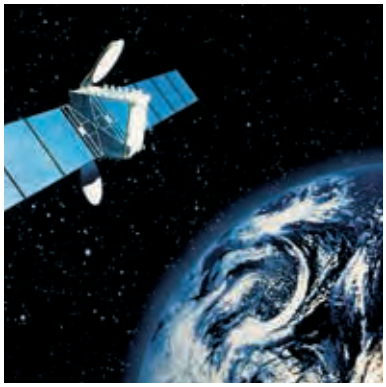
PROCESS INTERLINKING

Reliable and trouble-free just-in-time operation of processing stations around the clock are tasks that are masterfully fulfilled by Montrac. The versatile properties of Montrac allow a flexible connection of individual production steps up to a systematic process interlinking and complete automation of entire production lines.

ADVANTAGES OF MONTRAC

RELIABILITY

No production process should be unnecessarily blocked or even come to a standstill. All components of the Montrac system are extremely low-maintenance and durable. Thus Montrac is a very reliable transport system and prevents blockages and system failure thanks to its innovative technology. If nevertheless a defect should occur on a Shuttle (material handling vehicle), it can be removed fast and replaced in a single move without stopping the line.



SIMPLICITY

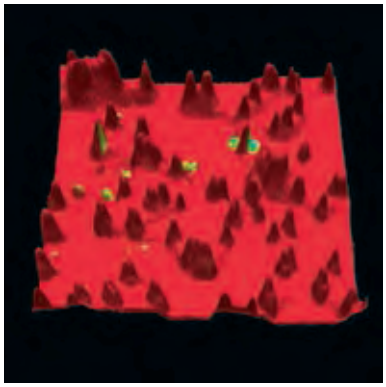
Montrac was designed to be extraordinarily simple. Thanks to the compact and standardized components of the monorail system planning and design are very simple and very space efficient. Thanks to the intelligent control the smart Montrac Shuttles (material handling vehicles) can find the transport destination on the monorail system independently.

FLEXIBILITY

Production processes are subject to constant change and continue to develop. At any time Montrac can quickly be adapted to new circumstances. All components have the same basis and are compatible with each other. Montrac can perfectly adapt to spatial conditions. The layout design possibilities are endless. Depending on the situation or need the transport track can also be mounted at the ceiling to keep the area free for material storage or for further processing steps. With the Montrac system, material handling vehicles with different transport tasks and pallet sizes can be used on the same rail system.

CLEAN ROOM

Thanks to its shape and the use of purely electrically driven components Montrac is designed as standard for the clean room.
Thanks to an improved development certain components have now been certified by the Fraunhofer Institute for Production Technology in clean room class 4. The use of Montrac in clean room ranges from the production of sensitive products such as hard disks and wafers up to the transport of medicine and plastic containers for medical applications.

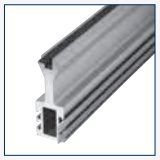


MONTRAC – THE MODULAR AUTOMATION AND TRANSPORT SYSTEM

Montrac is completely modular, can be freely and flexibly configured and thus can be easily extended at any time. Montrac consists of three main categories, in which the intelligent Shuttles (material handling vehicles) are the heart of every Montrac system. In addition a configurator software is available.

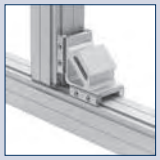
- Montrac components
- TracSet profile system
- TracControl control elements
- Software Montrac configurator



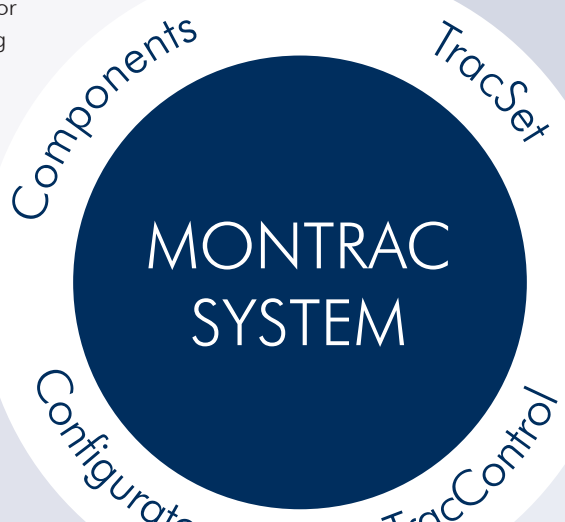


The monorail track system is defined with a selection of system components. For a flexible routing, features such as curves, switches and lifts are available. Montrac offers corresponding components for specific process or processing steps. More information to this can be found on pages 24 to 114.

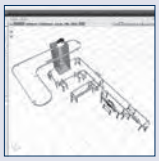
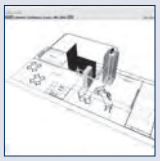




TracSet is a universal modular system for superstructures and base frames of the Montrac system. It offers a variety of possibilities. The profile system allows quick and easy installation without mechanical processing. More information to this can be found on pages 115 to 124 and 133 to 165

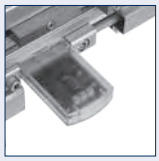


A cost-free configurator software is available for the planning and configuration of a Montrac system. Complete production lines can be easily configured with drag-and-drop commands and a 3D visualization with an appropriate bill of materials is available immediately. More information to this can be found on pages 16 to 17.

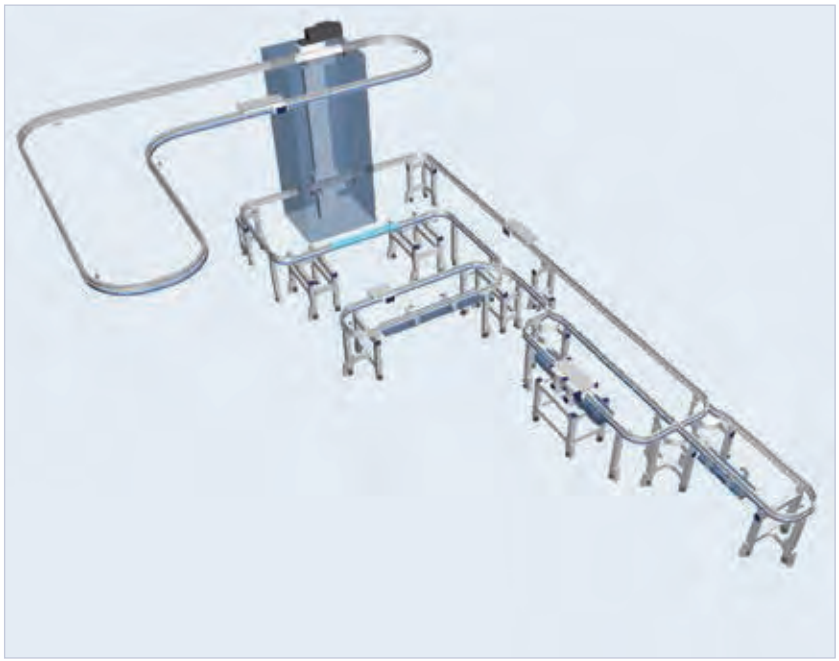

The TracControl drive control of the Montrac system can be designed according to individual requirements and provides flexible solutions for simple transport tracks up to complex production processes with interfaces to external controls or higher-level control systems. More information to this can be found on pages 18 to 23 and 84 to 99.





THE MONTRAC SYSTEM COMPONENTS

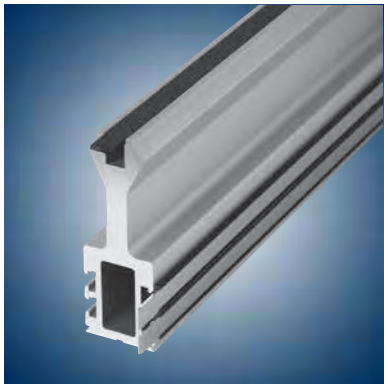
Montrac stands for absolute flexibility in conveyor technology and thus for practically unlimited possibilities, combined with user-friendly simplicity of the entire system.
For more than fifteen years Montrac has optimized global production and intralogistics processes of innovators. More and more there is a requirement to choose the most efficient way. If productivity is to be increased the first thought is to increase the number of machines. But this is not always necessary. The more cost effective and faster way to increase the productivity is to automate and/or optimize the material flow. This is hardly practicable with classical conveyor systems. Montrac can quickly, easily, flexibly and conveniently help with this project.



OVERVIEW OF THE MONTRAC COMPONENTS

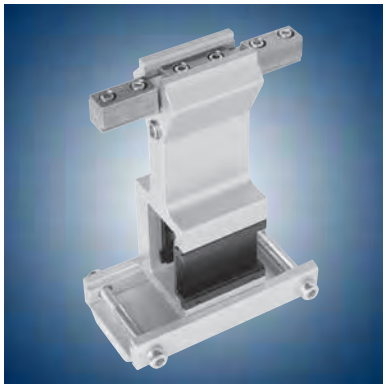
SHUTTLE

The Shuttles are the intelligent material handling vehicles and the centerpiece of every Montrac system. A Shuttle is available with one drive axis or as a Twin-Axle Shuttle. Each Shuttle has a sensor, which prevents potential collisions with obstacles or other Shuttles.



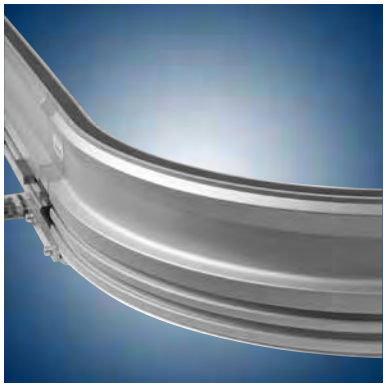
TRAC

The monorail consists of a colorless anodized aluminium rod extruded profile. The conductor rails can run along the left or right of the entire Trac, thus allowing a flexible positioning of the control modules. The Trac is compatible with the TracSet profile system.



TRACLINK

The TracLink is the connecting element between two Trac sections, it connects the conductor rails and serves as feeding point as well as support point.

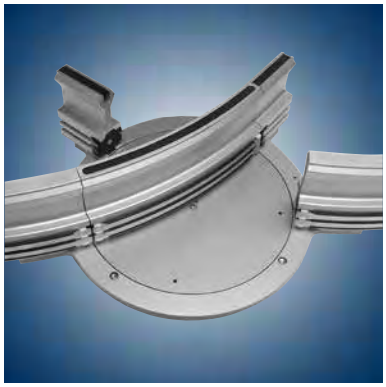


TRACCURVE

In the Montrac transport system changes of Trac direction by 45° or 90° are realized by curved Tracs. The minimum connection radius of 220 mm gives Montrac unparalleled flexibility.

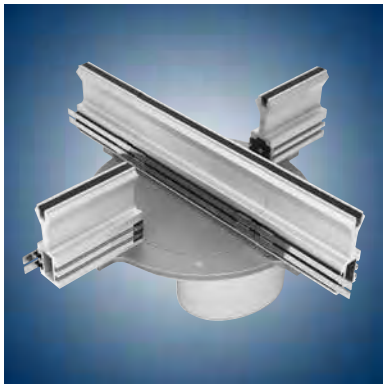
TRACSWITCH

The TracSwitch is used to distribute Shuttles from one lane to two, and vice versa. Thanks to the narrow radii, bypasses and branches are realized in a confined space. The TracSwitch is operated electrically and is powered directly from the conductor rails.



TRACSWITCH ARENA

The TracSwitch Arena serves to convey the Shuttles either from one lane to a bypass (45°-output) or to the main lane. Thus it is possible to perform a complete bypass with a single component.



TRACCROSSING

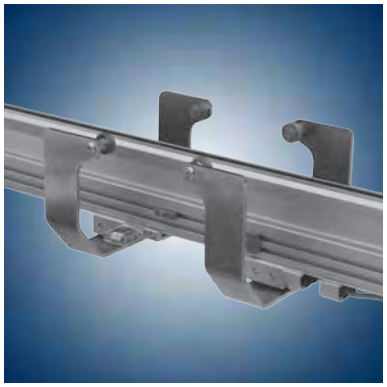
The crossing makes it possible for two lanes to intersect each other at a right angle. The electrical power is supplied directly from the conductor rails.

LIFT

The lift is used for the vertical transport of Shuttles to solve the following tasks: connecting two or more systems with different working heights and feeding of Shuttles from a station to a ceiling system or vice versa.

WORKPIECE PLATFORMS

The workpiece platforms are the link between the products and the Shuttle. The platforms are available in various sizes. The number and location of the positioning prisms is a customer-specific choice. The prisms serve as counterpart of the PositioningUnit locking points. .



SUPOTRAC

The SupoTrac serves as a support for manual workstations. In the SupoTrac the workpiece platform is slightly raised from the Shuttle. Thus processing is possible without having to strain the Shuttle with forces (the forces are transmitted to the Trac).

ERGOTRAC

With the ErgoTrac a manual workstation can be set up more ergonomically. The workpiece platform is tilted 25° towards the operator. This makes the platform ergonomically more easily accessible and improves the visibility.

POSITIONINGUNIT PU-4

A PositioningUnit is used when the Shuttle is to be precisely positioned and / or when the workpiece platform must be additionally supported during the machining operation. The PositioningUnit is available for single and multiple positioning.

TRACCONTROL COMPONENTS

The TracControl components are used to control the route and the Shuttles of a Montrac system.

TRACSET

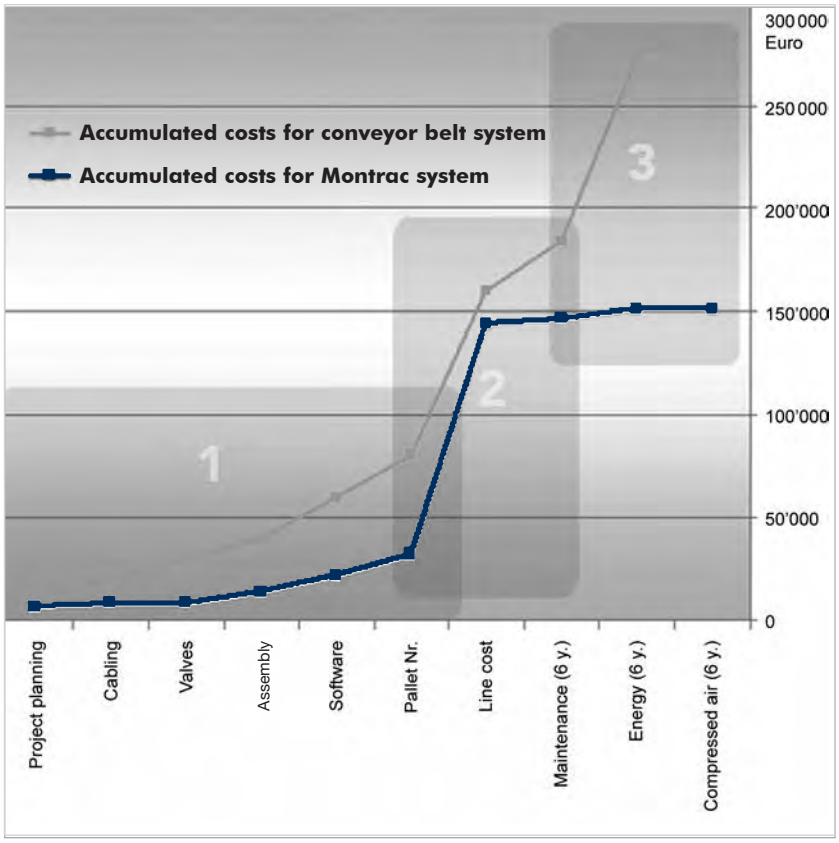
The profile system convinces through cross-product compatibility and flexibility. The proven dovetail system allows a quick and easy assembly of all Montrac products.

PROFITABILITY / EFFICIENCY

The latest development stage of the Montrac system is particularly aimed at increasing its efficiency.

The power for various components is directly supplied through the conductor rail, so very little cabling is required.

With the Chaos Technology the control effort is reduced or totally eliminated. Local control modules communicate with the Shuttles and control the line autonomously.



The following cost comparison resulted from a customers analysis:
A conveyor belt system with 34 motors, 11 stations and 48 pallets was compared to a Montrac system for the same application (24 Shuttles also with 11 stations). The initial price of the Montrac system is slightly higher than the price of the conveyor belt system. But already with the project planning, wiring, mounting and control Montrac is far below the price of the competitors. The cost comparison over 6 years results in a cost advantage of 46 % for the Montrac system.

CHAOS TECHNOLOGY

Chaos Technology is a method of allowing the Shuttles to operate the rail system of a Montrac transport system independently of a master control. The Chaos Technology originated from the possibility to link identity characteristics with control commands to allow track components to operate autonomously. The master control is relieved from the duties related to the temporally and functionally correct activation of rail system control elements. Thus, on master control level more attention can be given to the machining processes in the processing stations.

CHAOS TECHNOLOGY WITH TRACCONTROL 1

TracControl 1 IRMs (TC1-IRM) are used to control the track and the Shuttles by means of Chaos Technology. The Shuttles can receive and permanently save identification numbers (group and ID). They can also receive start commands. When the Shuttle is being positioned, it emits an "InPos" signal via infrared signal along with the stored identification numbers. The TC1-IRM can receive "InPos" signals and identification numbers from the Shuttle and directly pass them on to an interface. Due to their configuration the TC1-IRM can emit status signals and control signals to the interface and react logically when configured appropriately.

CHAOS TECHNOLOGY WITH TRACCONTROL 2

The modules connected to the central control unit TracControl 2 Unit (TC2U) can be operated by means of Chaos Technology, Control Technology or a mixed operation. In doing so, the operating mode may be defined for each module. In contrast to TracControl 1, a Shuttle ID (4 bytes) and a destination address (4 bytes) is stored in the Shuttle when using the TracControl 2. Since a modern infrared transmission protocol is used in the TracControl 2 control elements, these are not compatible with the TracControl 1 control elements. The TC2-IRM reports the Shuttle ID and the Shuttle destination address to the TC2U via the CAN bus. This reacts according to its configuration.

ADDRESSING THE COMPONENTS

All processing stations and components of the Montrac rail system that are connected to a logistics system are, for example, numbered consecutively. These numbers correspond to the addresses according to which the Shuttles orientate themselves in the system. The principle of the Chaos Technology is that upon completion of a working process in a processing station the Shuttle is given the next destination address. All control elements which are configured for Chaos Technology, autonomously respond to the destination address, causing the Shuttle to independently reach the next station. The code is simply the identification number (group and ID) in case of TracControl 1 and/or the Shuttle ID and destination address in case of TracControl 2. These are stored in the Shuttle and can be changed if necessary.

THE PRODUCT CONTROLS THE RAIL SYSTEM

A Shuttle announces its presence by sending a specific message. Among other things this message includes the identification numbers or the Shuttle ID and destination address. The TC1-IRM and/or TC2-IRM receives the message and passes it on. By sending the starting signal together with the code from the TC1-IRM and/or TC2-IRM the Shuttle is started. Based on this systematics the code of a Shuttle is communicated at each stop position and can be linked to a decision. This link ensures that the Shuttle, transporting a specific product and having certain identification numbers and/or Shuttle ID and destination address, branches off at a junction - and any otherwise addressed Shuttle does not.

MONTRAC CONFIGURATOR – THE CONFIGURATION SOFTWARE WITH UNLIMITED POSSIBILITIES

The Montrac Configurator is a very easy-to-use and free software within which you can create individual transport system layouts with a few mouse clicks. In the configurator, all standard components of the Montrac system are stored in a product library. These include for example Tracs, Shuttles, TracSwitches, PositioningUnits, base frames and much more. With drag and drop the desired components are positioned in the configuration window. The software detects the connection points by itself. The operation is very simple and intuitive. Should questions arise the integrated user manual provides detailed information on the layout design as well as the many other possibilities of this software. These include, for example, creation of parts lists, import of drawings and 3D export as well as various advices for an easier handling of the configurator.

SEQUENCE OF THE LAYOUT CREATION

The configuration of a Montrac layout is very simple. Whether based on known dimensions or on a hall drawing Tracs, curves, switches and other components can be placed at will. The integrated design buttons at the end of a marked element allow the rapid continuation of the routing with single mouse clicks. When Shuttles and TracControl components are placed, a fully functional transport system is configured. The configuration can be saved as a file and directly sent to the specialists for quotation management of montratec AG.

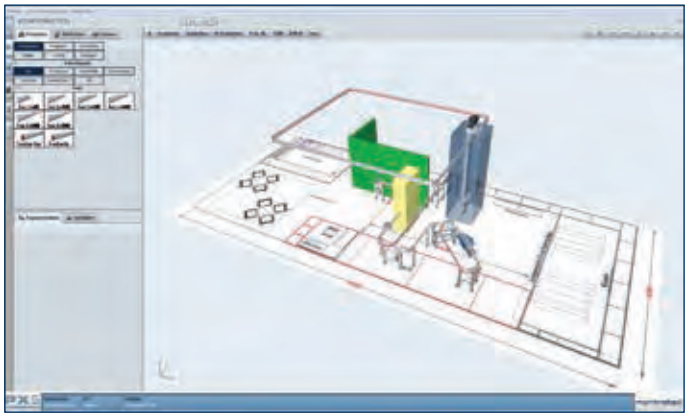
PRINCIPLE		
Technical information	Hall drawing	Ancillary conditions, dimensions

LAYOUT		
Track components	Base frames and Shuttle	Drive control components

QUOTATION	
Transmission of the PX file to montratec	Quotation for transport system

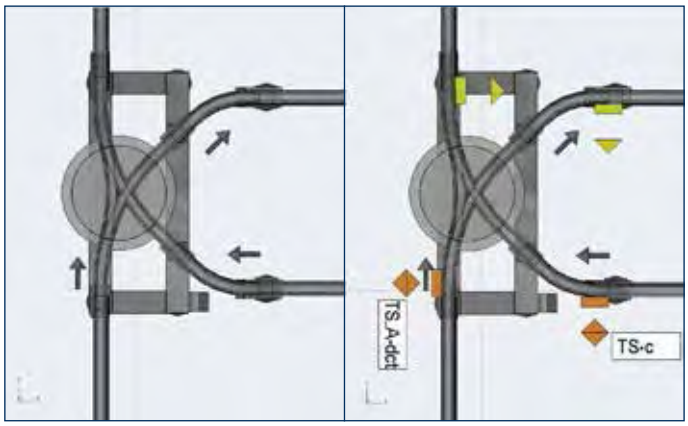
LINKING OF INFORMATION

The Montrac Configurator offers the possibility to import drawings and floor layouts and thus to plan customized Montrac systems to millimeter accuracy. With simple means 3D contours and surface elements can be added as well in order to reliably include interfering contours.
After completion of the planning the layout can be exported, for example, as a 3D-DWG. By import into a CAD program a complete 3D model, that is accurate in every detail, can be generated from this very quickly.



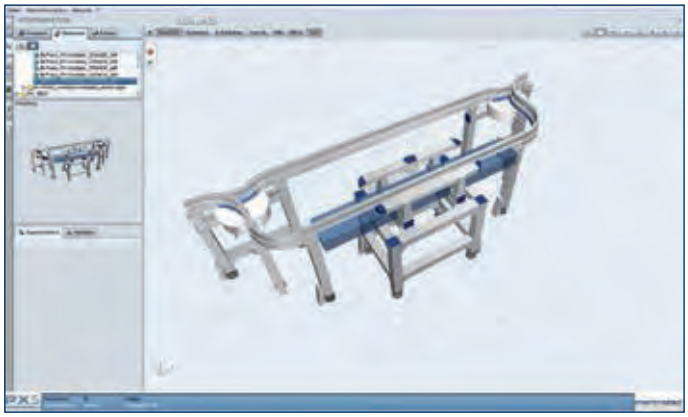
AUTOMATED PROCESS STEPS

The user-friendliness of the Montrac Configurator is characterized by the fact that several process steps are automated.
Thus, for example, all control elements required to control the route, can be added with one mouse click. In addition, an open routing can be closed with just one click after selection of the connection components. This considerably simplifies and accelerates the creation of a layout and also ensures that only the components actually required appear in the parts list.
So, without any programming skills, the control and/or control elements required can be configured.



LIBRARY

Various basic configurations of bypasses are stored in the integrated library. These frequently used assemblies can be easily positioned in the layout by means of drag & drop. There is also the possibility to store specially created assemblies in a personal library. Thus, the creation of the next Montrac layout will be even more simple.



The Montrac Configurator can be downloaded free from the website www.schmid-group.com.

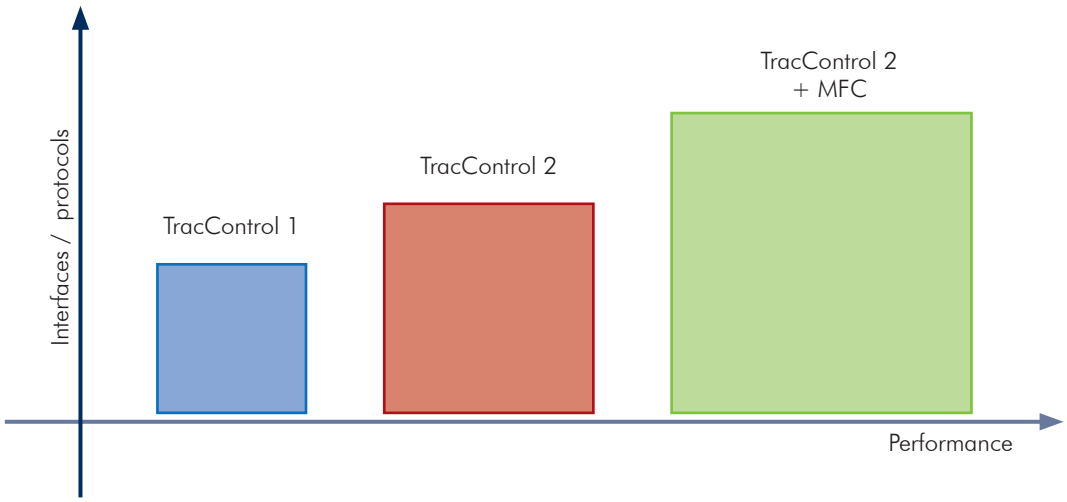
TRACCONTROL – THE VERSATILE MONTRAC CONTROL

For controlling the Montrac system TracControl components are used, which are also of modular design and which can be dimensioned depending on the requirement profile:

- Customer requirements
- Complexity of the application field (intralogistics, assembly automation, process interlinking)
- Required interfaces to customer-supplied systems
- Flexibility and extensibility
- Material flow control and material management
- Data logging

From a simple, fully autonomous transport track to complex, networked transport and manufacturing systems for automated manufacturing, the TracControl of Montrac offers the tailor-made and flexible control solution:

TRACCONTROL CONTROL SYSTEM



TRACCONTROL 1

TracControl 1 is a drive control based on Chaos Technology, where the rail system is decoupled from the process and no higher-level control is needed. Costs and complexity are reduced to a minimum, a flexible extension is possible at any time. As an option, communication is possible with external control elements (e.g. PLC) via I/O or RS232 interfaces.

TRACCONTROL 2

TracControl 2 allows different operating modes such as Chaos Technology, Control Technology or a mixed operation. Modules consisting of standardized Montrac components are controlled by the central control unit TracControl 2 Unit (TC2U). Configuration and control of the modules can be performed centrally by the TC2U. The TC2U provides for instance an Ethernet hardware interface to communicate with other controls or host computers. For this purpose the UDP based MDAC protocol (Montrac-specific protocol) is used. MDAC allows a guide system to control and monitor the Montrac system. As with TracControl 1, communication with external control units can be performed via I/O signals.

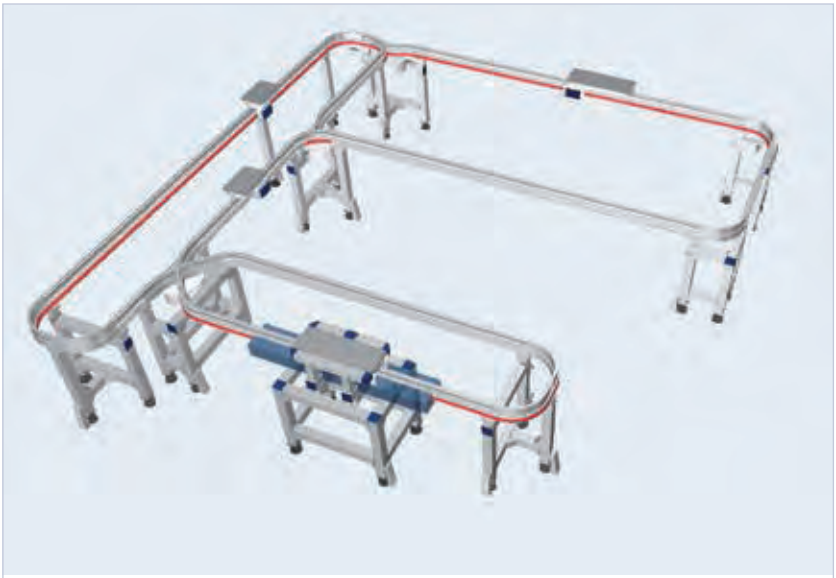
TRACCONTROL 2 + MFC

In addition to the scope of TracControl 2 the material flow can be controlled and visualized and the process data can be recorded by means of a Material Flow Controller (MFC). The MFC provides interfaces which use the SECS/GEM protocol, the MDAC protocol and OPC protocol. This allows to communicate with Host Manufacturing Execution Systems (MES) or third-party devices (such as robots).

CONTROL VARIANTS OF THE MONTRAC SYSTEM

BASIC PRINCIPLE OF COMMUNICATION

Programmable control elements (TC1-IRM / TC2-IRM) are arranged along the Montrac monorail system, communicating with the Shuttles (material handling vehicles) via infrared interface. The control elements along the rail system can be controlled in a preconfigured setup (autonomous operation) by the TracControl 2 Unit or they can be controlled by customer-specific systems (semi-autonomous operation). Within a Montrac system autonomously and semi-autonomously driven control elements can be mixed.



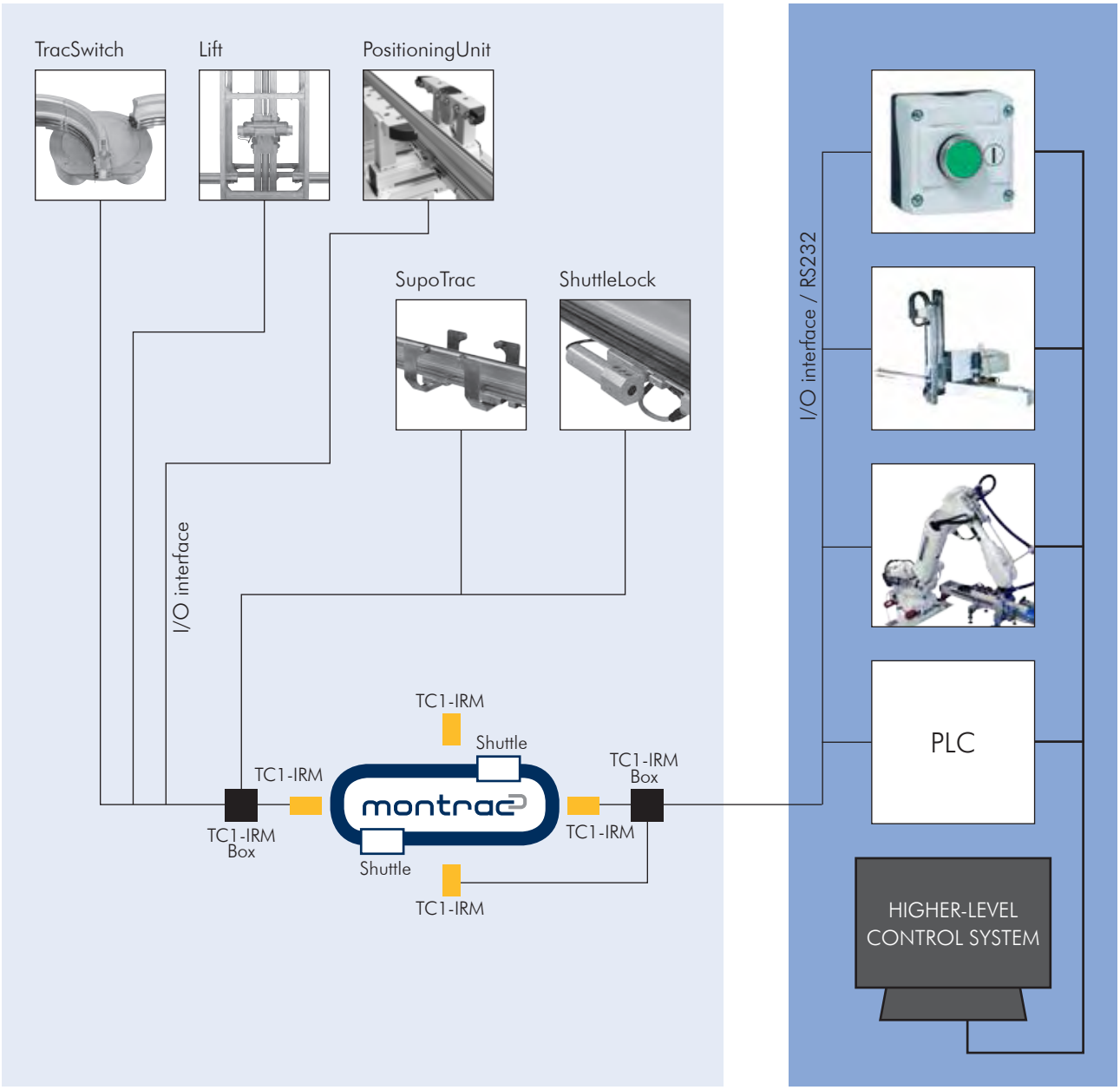
Simple Montrac system with TracControl 1 control

OVERVIEW OF TRACCONTROL CONTROL VARIANTS

Variant	Control philosophy	Central control unit	Control elements	Interfaces	
				Hardware	Protocol
TracControl 1	Autonomous		TC1-IRM		
	Partially autonomous	Customer-supplied control		I/O RS232	RS232
TracControl 2	Autonomous	TracControl 2 Unit (TC2U)	TC2-IRM		
	Partially autonomous	TracControl 2 Unit (TC2U)		I/O Ethernet	UDP (MDAC*)
TracControl 2 + MFC	System	TracControl 2 Unit (TC2U)	TC2-IRM	I/O Ethernet	OPC SECS/GEM MDAC*

* MDAC: Montrac-specific communication protocol based on UDP.

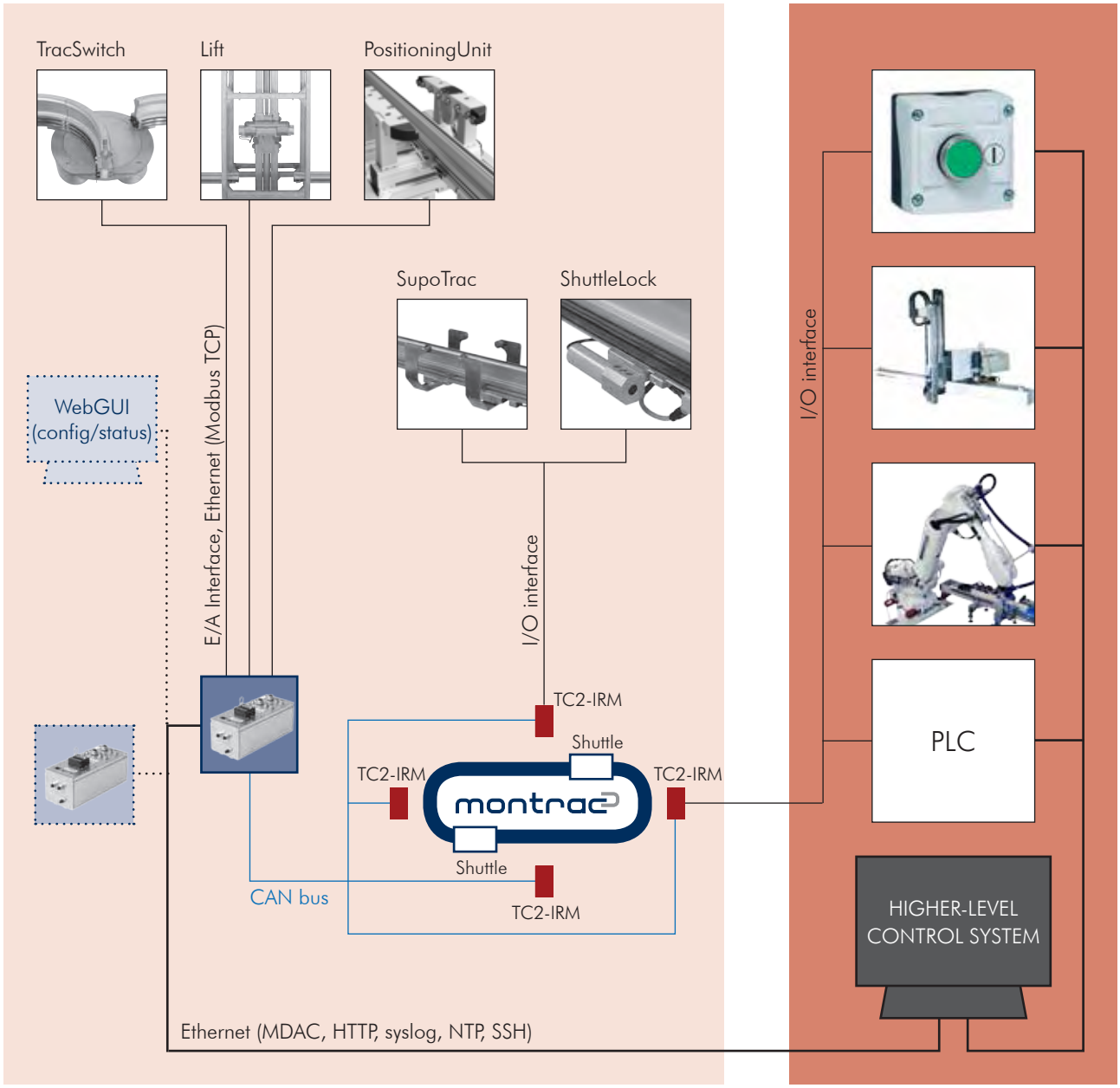
TRACCONTROL 1



TracControl 1 is based on the so-called Chaos Technology, which makes it possible to operate a Montrac system independently (autonomously) of a higher-level master control. The Chaos Technology decouples the rail system from the process, whereby the rail system establishes the logical connection between the process stations. This means that the rail system is set up according to rules which support the process and provide optimum supply of goods to the stations. So the Shuttle and the product controls the rail system self-reliantly. The Chaos Technology is based on a defined address system. In all decision points (e.g. switches, stations, etc.) it is programmed into the TC1-IRMs. The Shuttles have destination addresses that can be scanned at the decision points via the infrared interface and then pass on the Shuttle or the product accordingly.

According to requirements, individual decision points can be controlled via an external control (e.g. PLC or customer's control). This, for example, allows a Shuttle to program a product-state related destination address in order to define the next process step.

TRACCONTROL 2

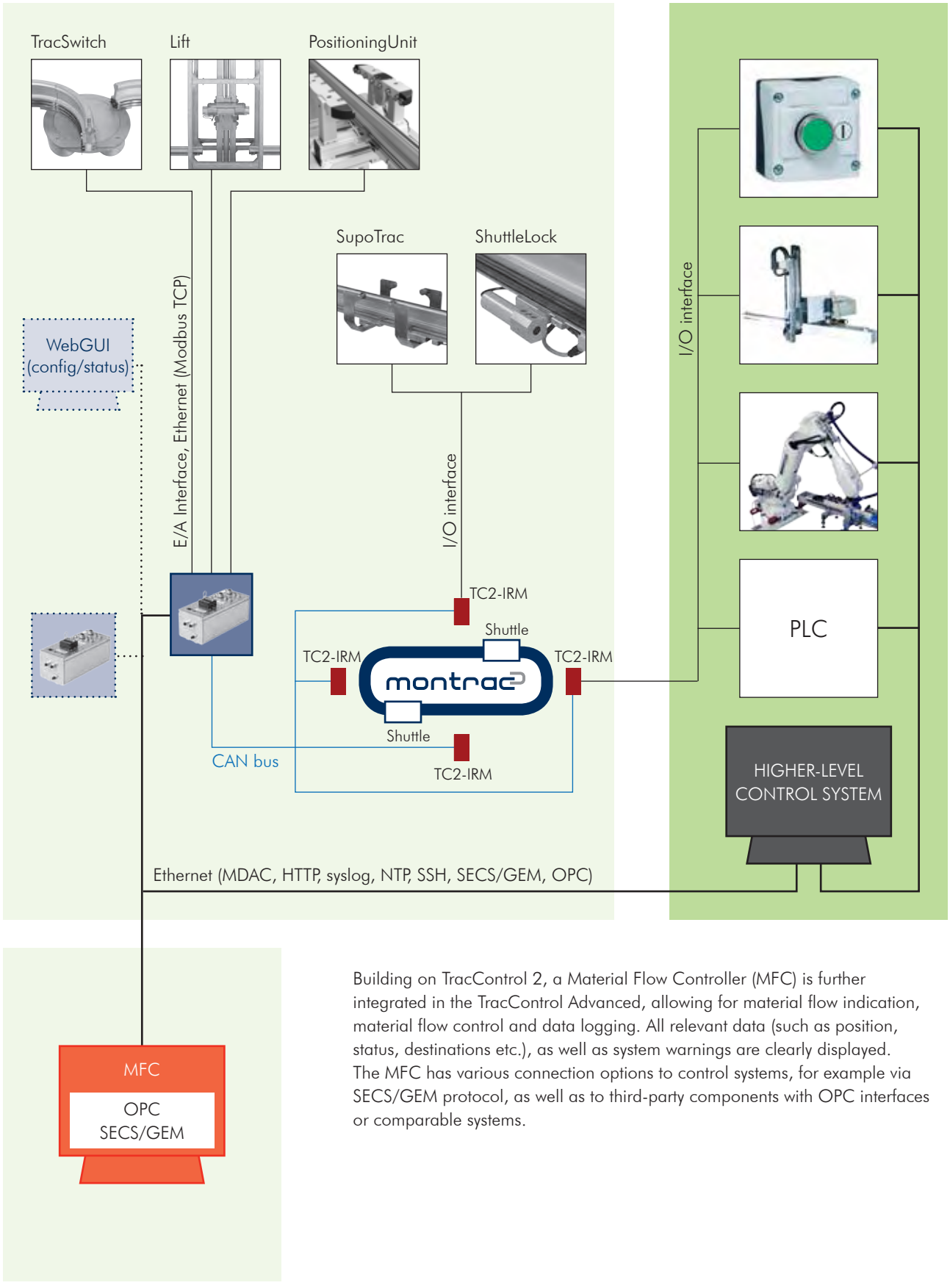


Compared to the TracControl 1, TracControl 2 interconnects the decision points (modules) along the rail system by means of a CAN bus and to manage the decision points via one or more central controls. The configuration of the drive control is performed centrally on the TracControl 2 Unit (TC2U). The modules can be controlled in different modes (Chaos Technology, Control Technology or mixed operation). The system status can be centrally recalled on the TC2U. All log messages of the individual modules are transmitted via syslog.

Further control elements (e.g. PLC) or a central host computer (e.g. MES) can be integrated via Ethernet.

* MDAC: Montrac-specific communication protocol based on UDP.

TRACCONTROL 2 + MFC

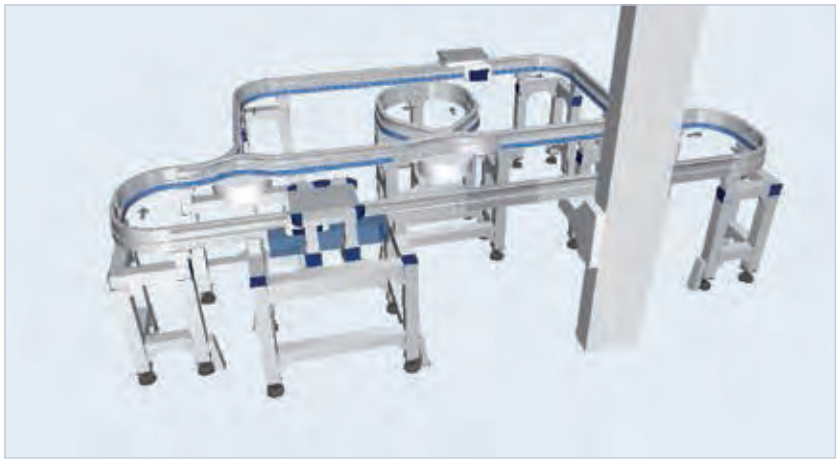


Building on TracControl 2, a Material Flow Controller (MFC) is further integrated in the TracControl Advanced, allowing for material flow indication, material flow control and data logging. All relevant data (such as position, status, destinations etc.), as well as system warnings are clearly displayed. The MFC has various connection options to control systems, for example via SECS/GEM protocol, as well as to third-party components with OPC interfaces or comparable systems.

* MDAC: Montrac-specific communication protocol based on UDP.

APPLICATION EXAMPLE FOR A MONTRAC SYSTEM

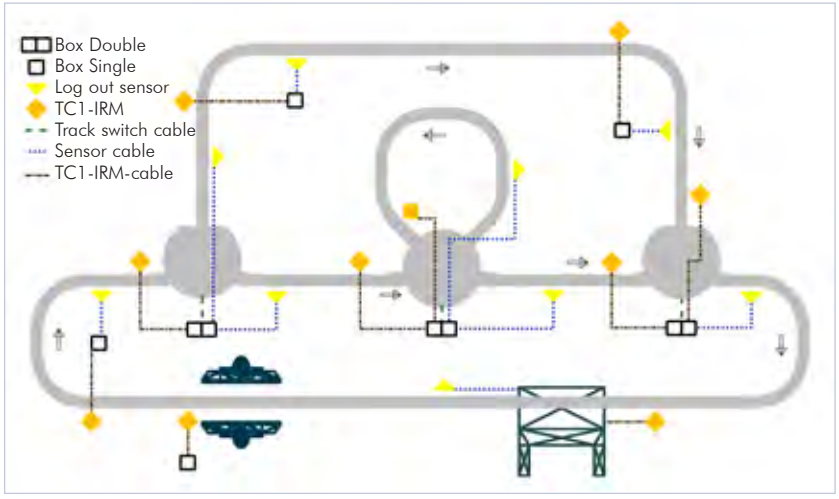
MECHANICAL LAYOUT IN 3D VIEW, CREATED WITH CONFIGURATOR SOFTWARE



SCHEMATIC REPRESENTATION WITH SENSORS, CONTROL ELEMENTS AND WIRING

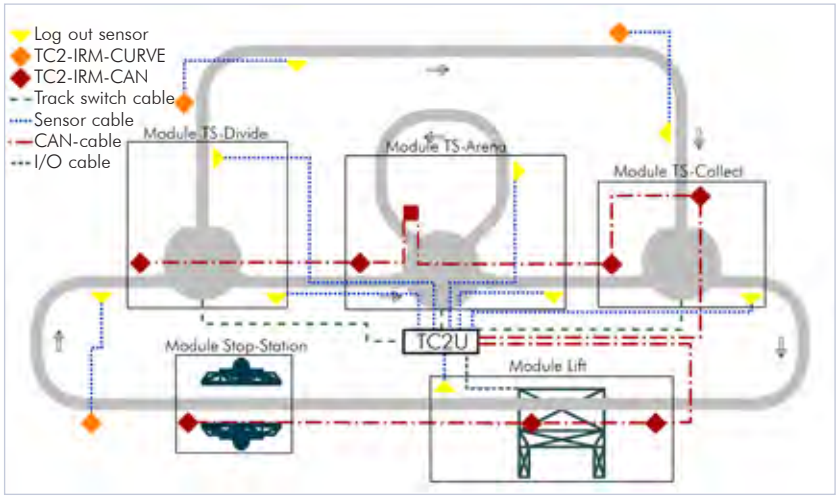
TRACCONTROL 1

In case of TracControl 1 the TC1-IRMs are wired on terminal strips in the Box Single and Box Double. According to the function the required sensors and actuators are connected to these.
In addition, the interfaces (digital inputs/outputs and RS232) are available on the terminal blocks.



TRACCONTROL 2

With TracControl 2 all cables can be easily and quickly connected to the respective components via plug-in connections. Autonomous components are not connected to the system. All components belonging to modules are connected to a TC2U, either directly by means of sensor cable/actuator cable or via the CAN bus. The TC2U can be linked to a customer supplied system via Ethernet. The digital I/O interface of the TC2-IRM can be directly picked up on these or on the TC2U.



SHUTTLE 3

The Shuttles are the intelligent material handling vehicles and the centerpiece of every Montrac system. Owing to their special shape they ride self-centered on the monorail. They are powered by a maintenance-free low voltage motor, which is located in the Shuttle axle. A Shuttle is available with one or two drive axles. The speed and the stop position of the Shuttle can be determined by means of cams which are screwed to the T-grooves of the Trac. The maximum running speed of Shuttle 3 amounts to 30 m/min. Additional loads up to 25 kg are possible. Each Shuttle has a sensor system by means of which it detects other Shuttles and obstacles on the rail system.

Shuttle 3 can be controlled with TracControl 1 and 2. When TracControl 2 is used for control, Shuttle 3 includes a 4096-byte FRAM on which any data can be written.

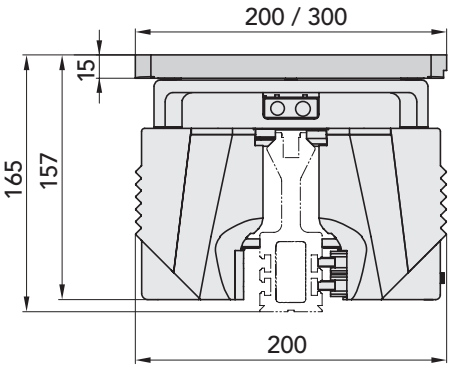
SHUTTLE 3 SPECIFICATIONS

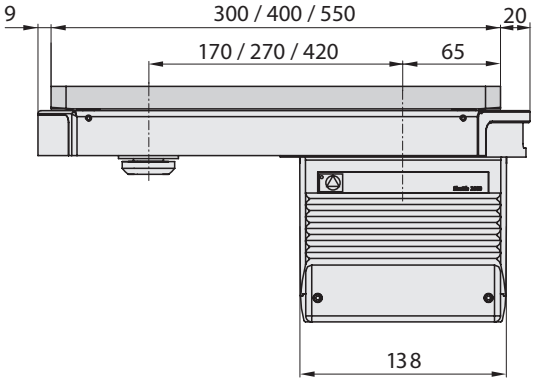
Shuttle			Shuttle 3	Twin-Axle Shuttle 3 (rear axle empty)	Twin-Axle Shuttle 3
Length		[mm]	300/400/550	550	550
Stopping accuracy		[mm]	± 1.0	± 1.0	± 1.0
Max. running speed v_{max}		[m/min]	30	30	30
Reduced running speed v_{red}		[m/min]	12	12	12
Max. weight[1)]		[kg]	17	17	34
Shuttle weight without platform		[kg]	3.8/4.1/4.6	6.2	9.0
Static moment around the longitudinal axis		[Nm]	≤ 2	≤ 4	≤ 4
Supply voltage		[V DC]	24	24	24
Power consumption:	during standstill	[A]	0.08	0.08	0.16
	at V_{max}	[A]	0.80	0.80	1.90
	when accelerating	[A]	2.24	2.24	4.48
Accelerating time	unloaded[2)]	[sec]	0.85	0.85	0.80
	with max. add. load[2)]	[sec]	1.40	1.40	1.10
Sound pressure level		[dBA]	< 59		
Ambiance:	Temperature	[°C]	10 to 40		
	Rel. air humidity		5 % – 85 % (without condensation) normal workshop ambiance		
	Air purity level				

[1)] Weight of Shuttle + plate + load capacity on page 26.

[2)] Until 0.95 x V_{max} is reached.

SHUTTLE 3 DIMENSIONS

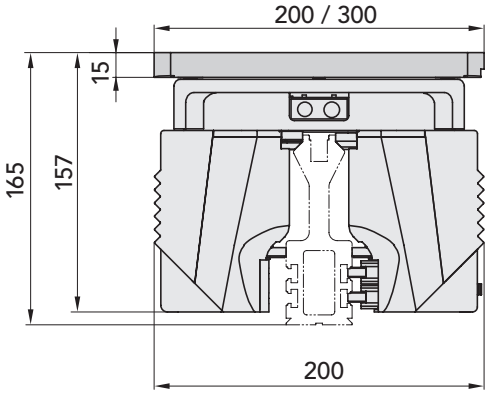


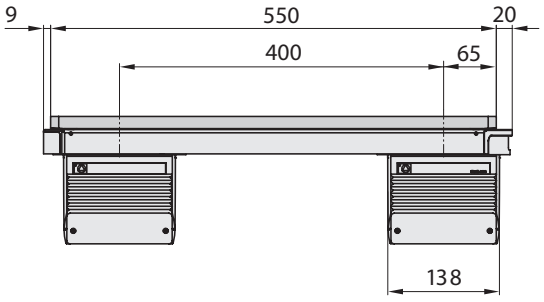


Shuttle 3	Part no. TC1	Part no. TC2
CW for platform length 300 mm	MT54793	MT65010
CCW for platform length 300 mm	MT54794	MT65011
CW for platform length 400 mm	MT54795	MT65012
CCW for platform length 400 mm	MT54796	MT65013
CW for platform length 550 mm	MT54797	MT65014
CCW for platform length 550 mm	MT54798	MT65015

Other Shuttle lengths on request

TWIN-AXLE SHUTTLE 3 DIMENSIONS



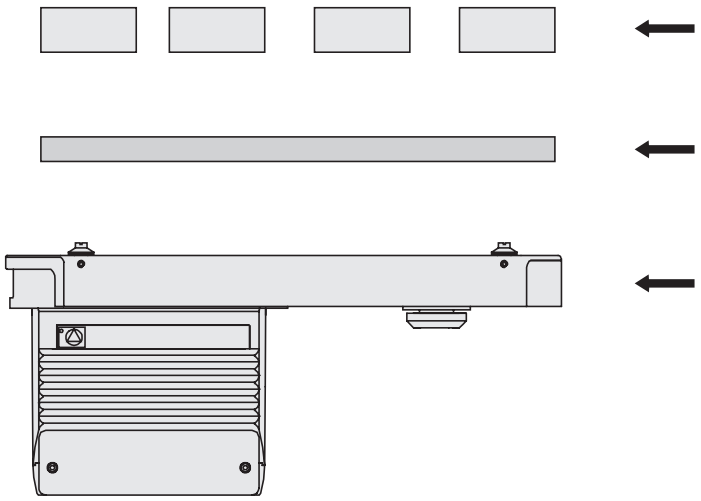


Twin-Axle Shuttle 3	Part no. TC1	Part no. TC2
CW	MT54799	MT65016
CCW	MT54800	MT65017
CW (rear axle empty)	MT54801	MT65018
CCW (rear axle empty)	MT54802	MT65019

Other Shuttle lengths on request

SHUTTLE 3 LOAD LIMITS

The center of gravity of the load should be centered and not higher than 130 mm above the Shuttle.
For more information see operating manual of Shuttle 3.



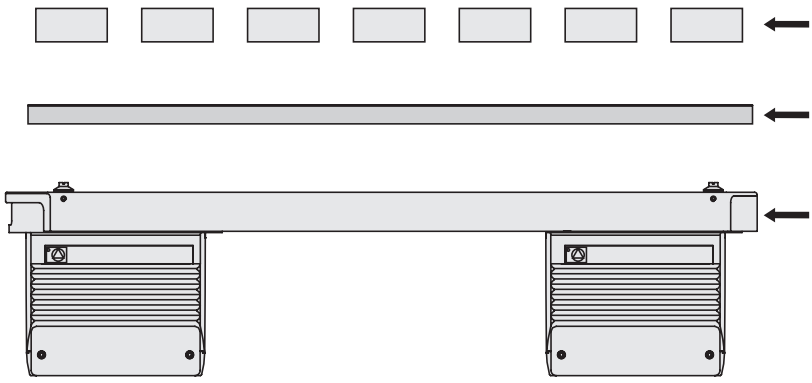
mn = load capacity (17 kg - ms - mp)
(transported parts including their mounting on the platform)

mp = platform weight
(see table on page 33)

ms = Shuttle weight
(see table on page 24)

TWIN-AXLE SHUTTLE 3 LOAD LIMITS (REAR AXLE EMPTY)

The center of gravity of the load should be centered and not higher than 130 mm above the Shuttle.
For more information see operating manual of Shuttle 3.



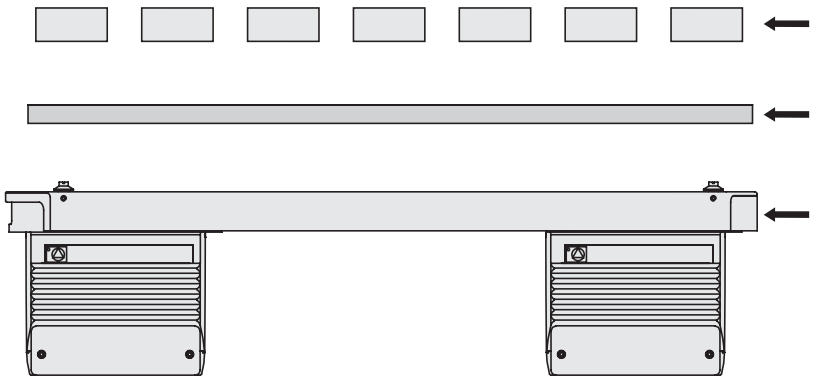
mn = load capacity (17 kg - ms - mp)

mp = platform weight
(see table on page 33)

ms = 6.2 kg

TWIN-AXLE SHUTTLE 3 LOAD LIMITS

The center of gravity of the load should be centered and not higher than 130 mm above the Shuttle.
For more information see operating manual of Shuttle 3.



mn = load capacity (34 kg - ms - mp)

mp = platform weight
(see table on page 33)

ms = 9 kg

SHUTTLE MSH-4

The Shuttles are the intelligent material handling vehicles and the centerpiece of every Montrac system. Owing to their special shape they ride self-centered on the monorail. They are powered by a maintenance-free low voltage motor, which is located in the Shuttle axle. A Shuttle is available with one or two drive axles. The speed and the stop position of the Shuttle can be determined by means of cams which are screwed to the T-grooves of the Trac.. Using pre-configuration of the speed parameters, individual customer needs can be addressed best. The maximum running speed of Shuttle MSH-4 amounts to 55 m/min. Additional loads up to 30 kg are possible. Each Shuttle has a sensor system by means of which it detects other Shuttles and obstacles on the rail system.

Shuttle MSH-4 can be controlled with TracControl 1 and 2. When TracControl 2 is used for control, Shuttle MSH-4 includes a 4096-byte FRAM on which any data can be written.

Advantages of Shuttle MSH-4:

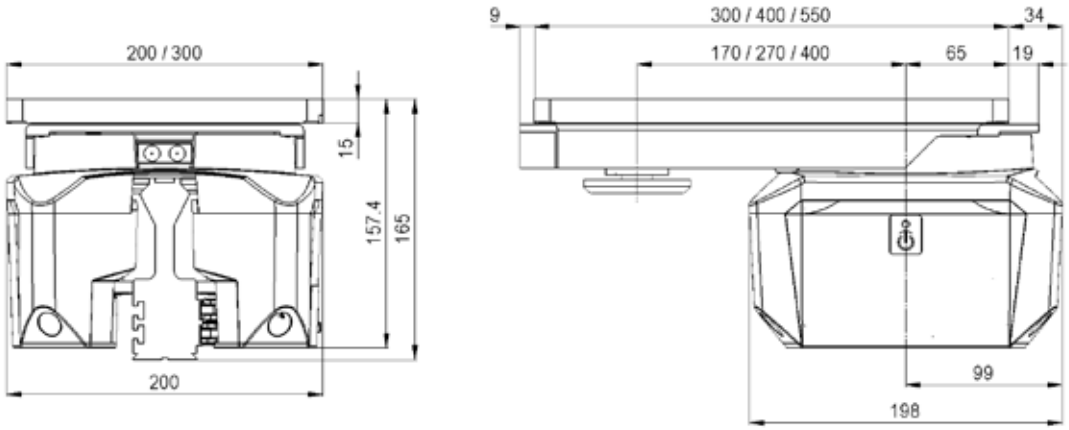
- Preconfigurable speed
- Max speed 55 m/min
- Robust mechanics
- Additional loads up to 30 kg are possible.
- Additional interface

SHUTTLE MSH-4 SPECIFICATIONS

Shuttle			Shuttle MSH-4 L = 300 mm	Shuttle MSH-4 L = 400 mm	Shuttle MSH-4 L = 550 mm	Twin-Axle Shuttle MSH-4 L = 550 m
Length		[mm]	343	443	593	593
Weight		[kg]	5	5.3	5.8	8.8
Max. total weight[1)]		[kg]	20	20	20	38
Stopping accuracy over n Shuttles		[mm]	± 1.0			
Running speed v_B		[m/min]	30			
Reduced running speed v_{AB}		[m/min]	12			
Increased max. speed for defined sections		[m/min]	55			
Supply voltage		[V DC]	24 (max. 30)			
Power consumption:	during standstill	[A]	0.1	0.1	0.1	0.15
	at v_B (30 m/min)	[A]	0.7	0.7	0.7	1.6
	at v_{max} (55 m/min)	[A]	1	1	1	1.8
	when accelerating	[A]	2.1	2.1	2.1	3.1
Acceleration time:	unloaded	[sec]	0.5			
(30 m/min)	with max. add. load	[sec]	0.9			
Cycle time:	with max. add. load	[sec]	2.8	3.0	3.2	3.2
Sound pressure level		[dBA]	< 65			
Ambience:	Temperature	[°C]	10 to 40			
	Rel. air humidity		5 % – 85 % (without condensation) normal workshop ambiance			
	Air purity level					
Minimum requirements / compatibility			TracCurve, starting from serial no. 695586-XXX TracSwitch, starting from serial no. 722157-XXX TracSwitch Arena, starting from serial no. 691469-XXX Communication module: OSM3, TC1-IRM or TC2-IRM			

[1)] Weight of Shuttle + plate + load capacity on page 31.

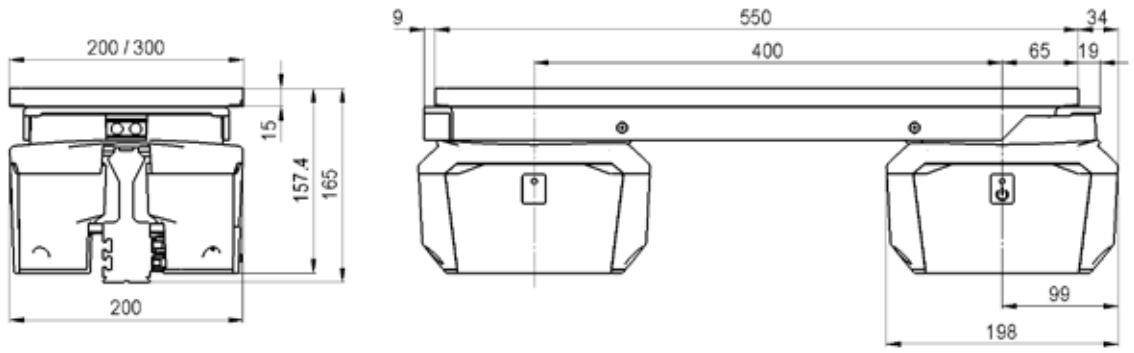
SHUTTLE MSH-4 DIMENSIONS



Shuttle MSH-4		Part no. TC1	Part no. TC2
M1-SH4-CW-L300-1-1WD-TC1	M1-SH4-CW-L300-1-1WD-TC2	MT61712	MT65281
M1-SH4-CCW-L300-1-1WD-TC1	M1-SH4-CCW-L300-1-1WD-TC2	MT58836	MT65280
M1-SH4-CW-L400-1-1WD-TC1	M1-SH4-CW-L400-1-1WD-TC2	MT61714	MT65283
M1-SH4-CCW-L400-1-1WD-TC1	M1-SH4-CCW-L400-1-1WD-TC2	MT61713	MT65282
M1-SH4-CW-L550-1-1WD-TC1	M1-SH4-CW-L550-1-1WD-TC2	MT61716	MT65285
M1-SH4-CCW-L550-1-1WD-TC1	M1-SH4-CCW-L550-1-1WD-TC2	MT61715	MT65284

Other Shuttle lengths on request

TWIN-AXLE SHUTTLE MSH-4 DIMENSIONS

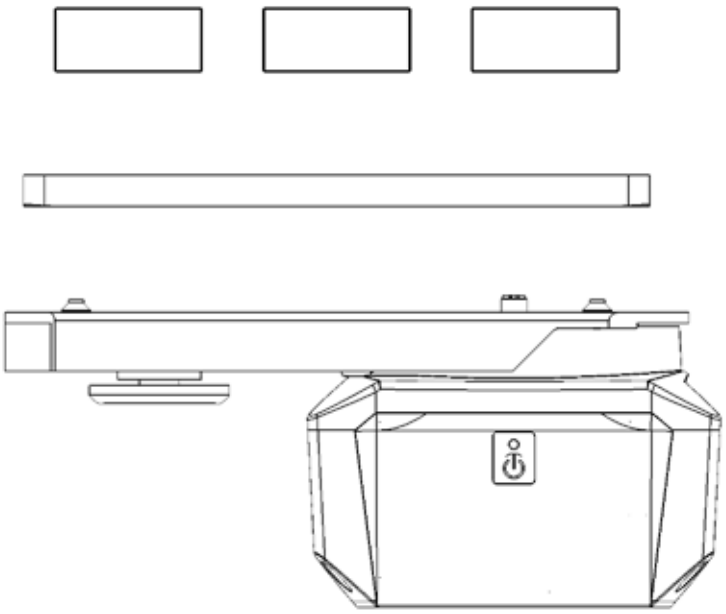


Twin-Axle Shuttle MSH-4		Part no. TC1	Part no. TC2
M1-SH4-CW-L550-2-2WD-TC1	M1-SH4-CW-L550-2-2WD-TC2	MT61717	MT65287
M1-SH4-CCW-L550-2-2WD-TC1	M1-SH4-CCW-L550-2-2WD-TC2	MT58783	MT65286

Other Shuttle lengths on request

SHUTTLE MSH-4 LOAD LIMITS

The center of gravity of the load should be centered and not higher than 130 mm above the Shuttle.
For more information see operating manual of Shuttle MSH-4.



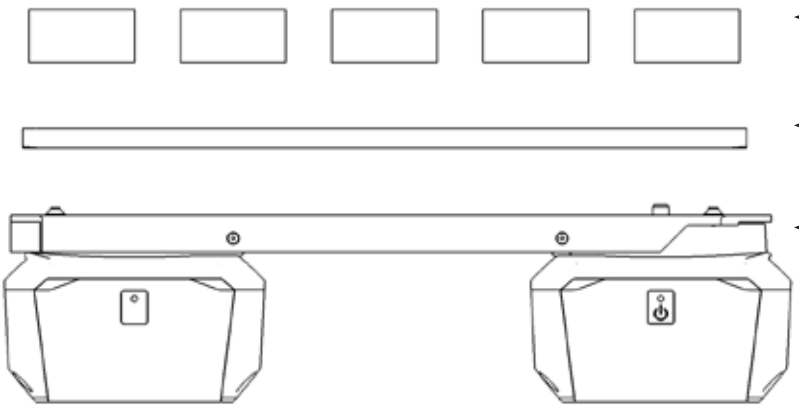
mn = load capacity (20 kg - ms - mp)
(transported parts including their mounting on the platform)

mp = platform weight
(see table on page 33)

ms = Shuttle weight
(see table on page 28)

TWIN-AXLE SHUTTLE MSH-4 LOAD LIMITS

The center of gravity of the load should be centered and not higher than 130 mm above the Shuttle.
For more information see operating manual of Shuttle MSH-4.

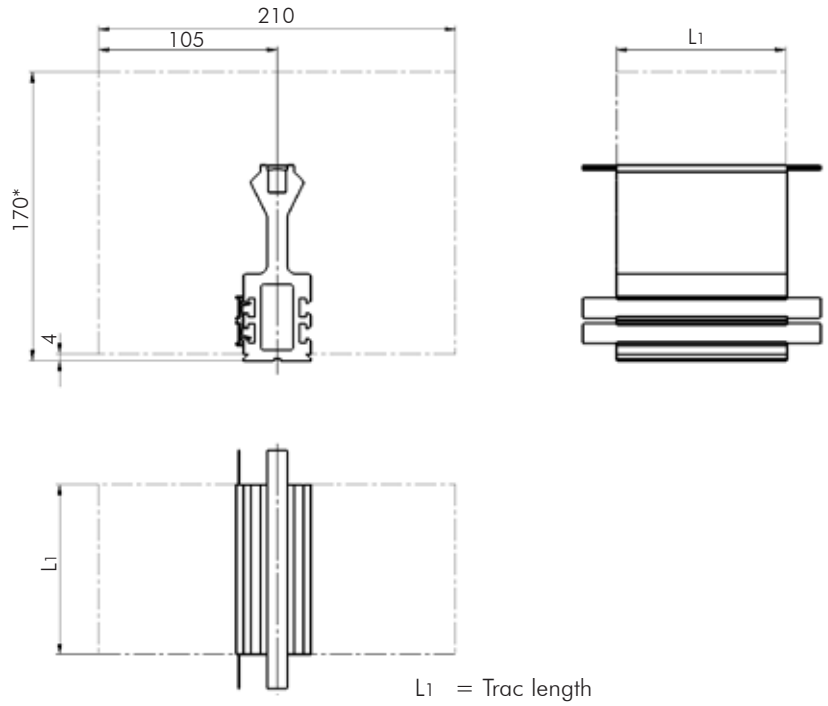


mn = load capacity (38 kg - ms - mp)

mp = platform weight
(see table on page 33)

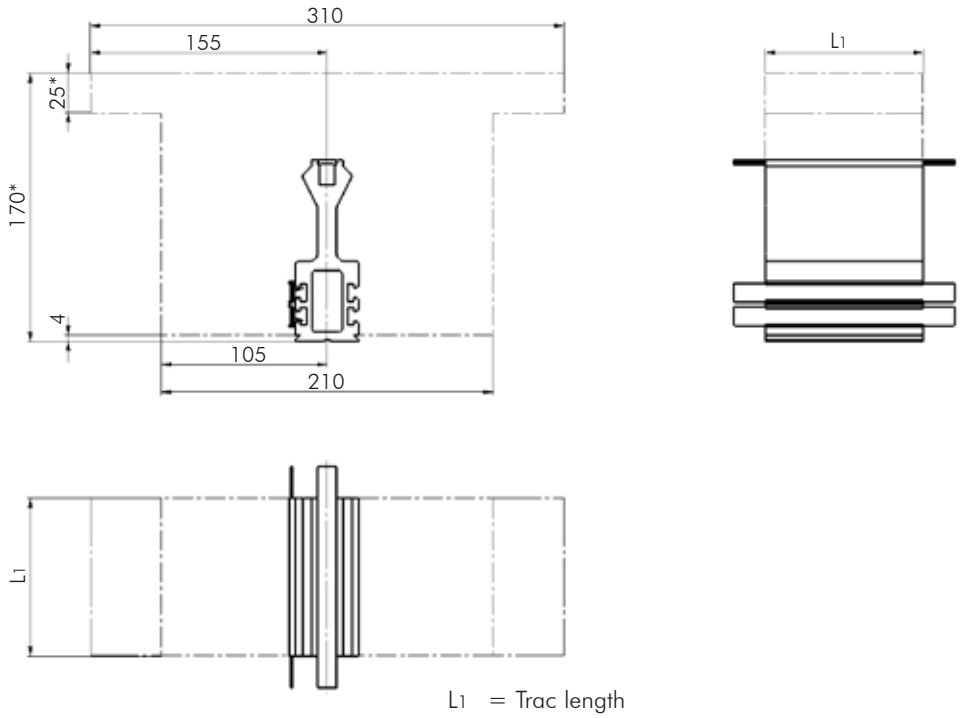
ms = Shuttle weight
(see table on page 28)

FREE SPACE FOR SHUTTLE 3 AND SHUTTLE MSH-4 WITH WORKPIECE PLATFORM
200 X 300 MM / 200 X 400 MM / 200 X 550 MM



L1 = Trac length
- - - = Boundary line (the area within this boundary line must remain free.)
* Depending on the load the free space will need to be increased upward.

FREE SPACE FOR SHUTTLE 3 AND SHUTTLE MSH-4 WITH WORKPIECE PLATFORM
300 X 400 MM / 300 X 550 MM



L1 = Trac length
- - - = Boundary line (the area within this boundary line must remain free.)
* Depending on the load the free space will need to be increased upward.

WORKPIECE PLATFORM

The workpiece platforms are the link between the products and the Shuttle.
The platforms are available in various sizes between 200 mm x 300 mm and 300 mm x 550 mm. Other sizes and the number and distribution of the positioning prisms are a customer-specific choice.

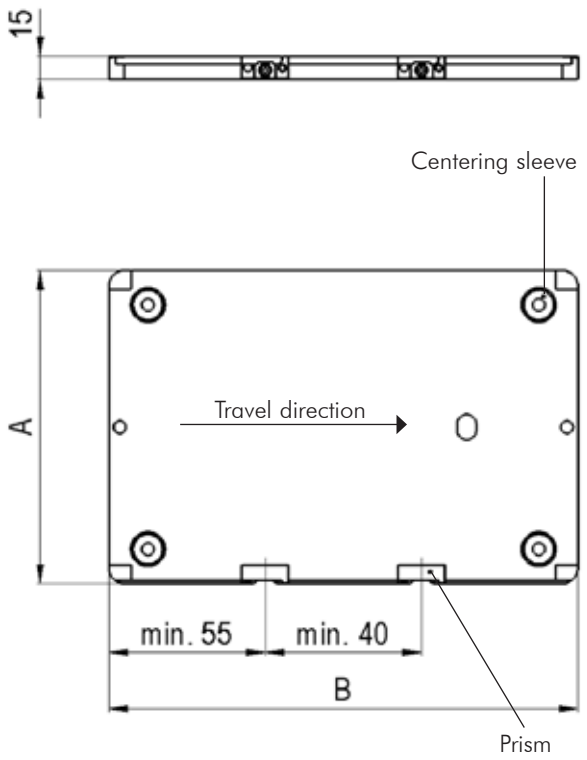
Scope of delivery:
– includes 4 center sleeves
– without processing of the prism (specific processing of the platform for positioning of prisms or drill holes for superstructures can be done by the customer himself).

The production drawing for milling of platforms for positioning the prisms can be downloaded from the website at www.montratec.com under "support", "forms".
If requested by the customer, the prisms can also be placed by montratec AG.

PLATFORM SPECIFICATIONS

Net weight	200 x 300 mm	[kg]	2.5
	200 x 400 mm	[kg]	3.3
	300 x 400 mm	[kg]	5.0
	200 x 550 mm	[kg]	4.6
	300 x 550 mm	[kg]	6.9
Ambience:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 % – 85 % (without condensation) normal workshop ambiance
	Air purity level		
Minimum requirements / compatibility			Shuttle 3 and Shuttle MSH-4

PLATE DIMENSIONS



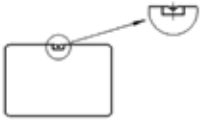
Workpiece platforms A x B	max. number prisms	platforms without Prism Part no.
200 x 300 x 15 mm	5	MT91677
200 x 400 x 15 mm	8	MT56947
300 x 400 x 15 mm	8	MT91683
200 x 550 x 15 mm	12	MT56948
300 x 550 x 15 mm	12	MT56949

Special sizes on request

Accessories for workpiece platform	Part no.
Prism for workpiece platform	MT46300
Set of centering sleeves	MT91811

STANDARD DIMENSIONS

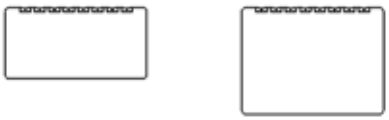
Platform 200 x 300 mm, single



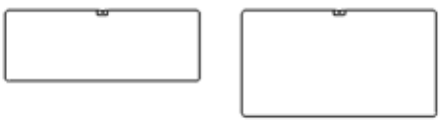
Platform 200 x 300 mm, multiple
(max. 5 prisms)

Platform 200 x 400 mm, single
Platform 300 x 400 mm, single

Platform 200 x 400 mm, multiple
Platform 300 x 400 mm, multiple
(max. 8 prisms)



Platform 200 x 550 mm, single
Platform 300 x 550 mm, single



Platform 200 x 550 mm, multiple
Platform 300 x 550 mm, multiple
(max. 12 prisms)

TRAC

The monorail consists of a colorless anodized aluminium rod extruded profile.

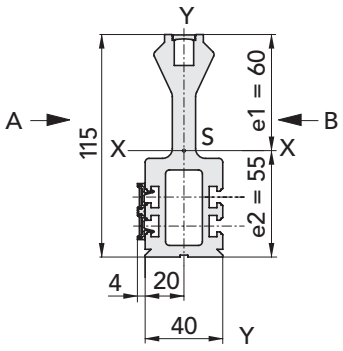
The conductor rails can run along the left or right of the entire Trac,. thus allowing a flexible positioning of the control modules.

The Trac is compatible with the TracSet profile system.

TRAC SPECIFICATIONS

Net weight		[kg/m]	5.3
Cross-sectional area		[mm^2]	1957
Section modulus Wx Section modulus Wy		[cm^3] [cm^3]	37.7 10.8
Moment of inertia Jx Moment of inertia Jy		[cm^4] [cm^4]	230 21.6
Length tolerance		[mm]	±0.5
Torsion tolerance		[mm/m]	1
Straightness tolerance		[mm/m]	1
Material			Aluminum, nickel-plated copper, plastic
Nominal voltage		[V DC]	24
Current carrying capacity		[A]	64
Ambiance:	Temperature Rel. air humidity Air purity level	[°C]	10 to 40 5 % – 85 % (without condensation) normal workshop ambiance
Minimum requirement / compatibility			TracLink MT57949

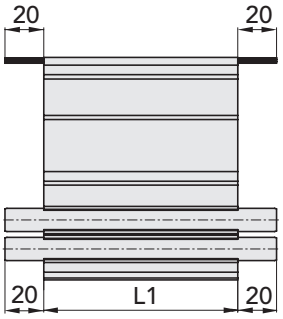
TRAC DIMENSIONS



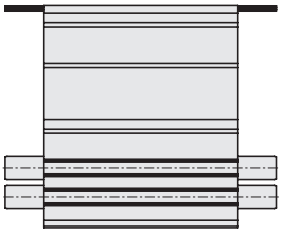
Trac	Part no.
L1 = 2960 mm	MT56926/2960
xxxx any length between 60 and 2960 mm is available	MT56926/xxxx available in 1 mm steps

Guide profile, conductor rail and cover profile are included in the scope of delivery

View A



View B



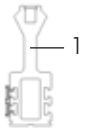
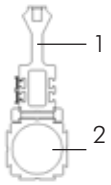
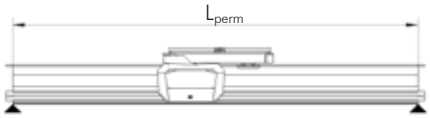
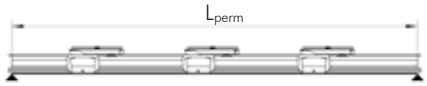
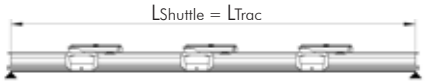
ACCESSORIES FOR TRAC

	Part no.
Guidance profile	MT90416/xxxx
Conductor rails	MT508346/xxxx
Cover profile	MT91257/xxxx
T-slot cover (L=3000 mm)	MT56973
Base frame for Trac	MT54819
Single leg support	MT91565
for Trac – Trac double leg support	MT91569
for TracLink – Trac 3-leg support	MT57948
4-leg support	MT58301

MECHANICAL LOAD CAPACITY

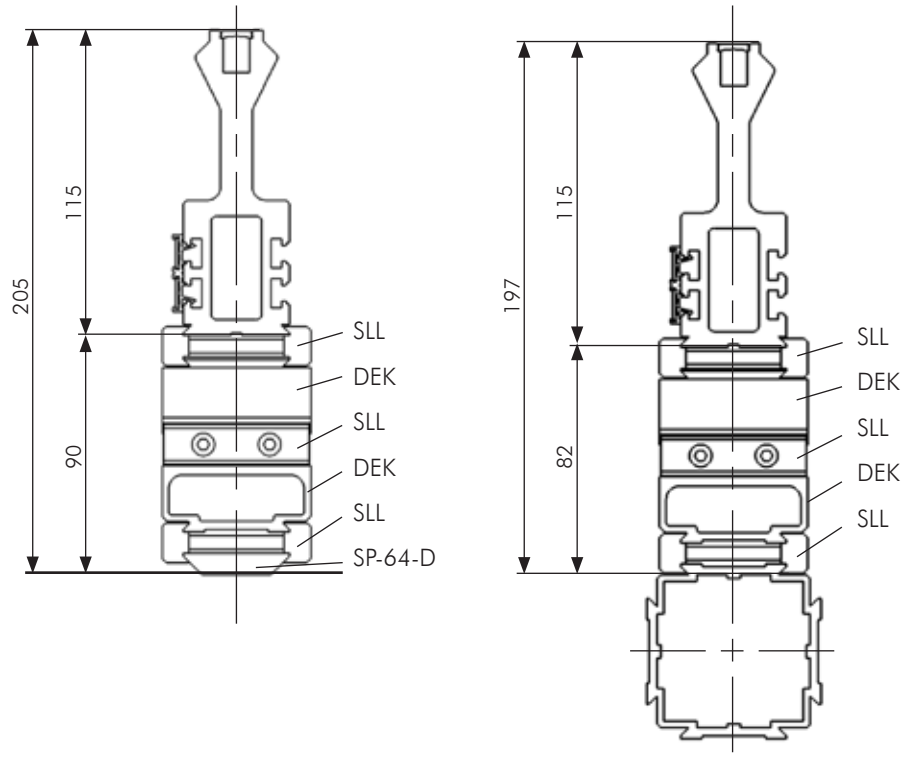
During installation the potential number of fully loaded Shuttles on a track section needs to be considered. Depending on this number the monorail must be supported over certain track sections.

The permissible length of a track section supported at both ends (L_{perm}), depending on the number of Shuttles, must comply with the following table. The Trac (1) can also be equipped with a reinforcement (2) (TP-66). In this case the permissible length of a supported track section may be larger (see table below).

Number of fully loaded Shuttles	L_{perm} (permissible length) of a track section supported at both ends	
	without reinforcement	with reinforcement (TP-66)
		
	3.8 m	6.1 m
	2.7 m	4.3 m
	2.4 m	3.9 m

ASSEMBLY EXAMPLE

The support between the rails and the base frame is usually at the TracLink.



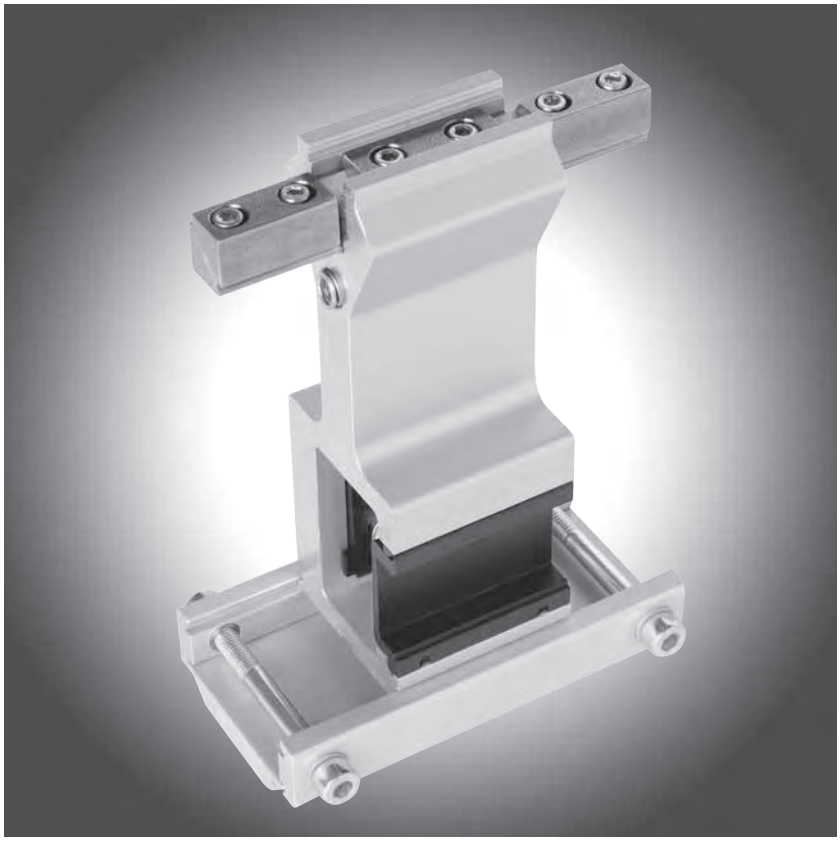
For more information about the components of the TracSet, please refer to chapter TracSet, starting on page 133.

TRACLINK

The TracLink is the connecting element between two Trac sections or active components (e.g. TracSwitch).

This element provides the electrical connection for the conductor rails and allows for thermal dilatation.

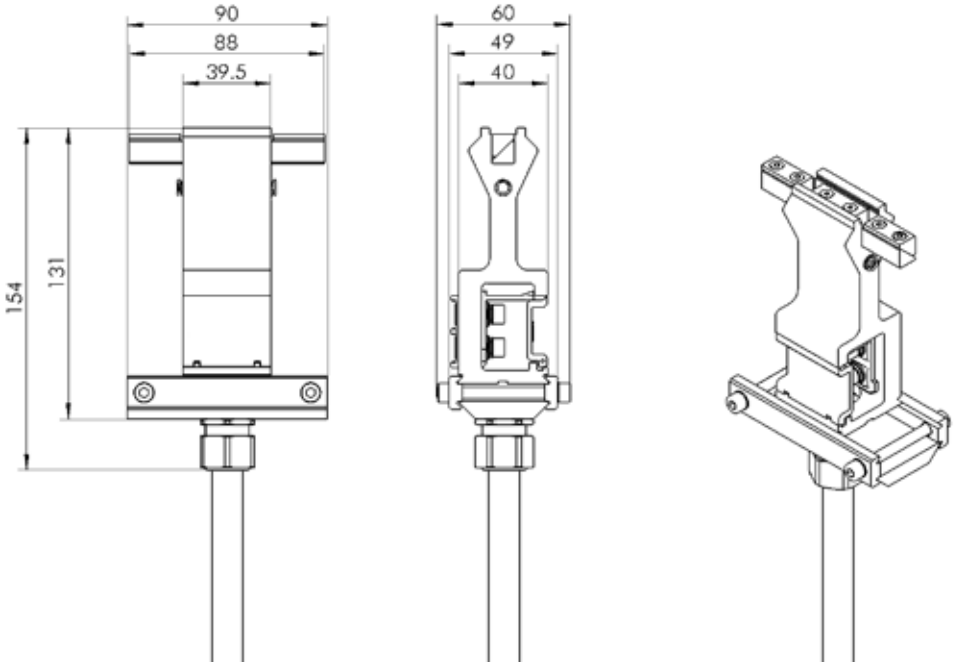
The power supply to the system is also performed by TracLink. With the built-in connection the GND conductor rail is connected to the potential of the TracLink aluminum body.



TRACLINK SPECIFICATIONS

Net weight		[kg]	0.25
Material			Aluminum, copper, steel, brass, plastic
Nominal voltage		[V DC]	24
Current carrying capacity		[A]	64
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 % – 85 % (without condensation)
	Air purity level		normal workshop ambiance
Minimum requirement / compatibility			Trac MT56926/XXXX

TRACLINK AND POWER SUPPLY CABLE DIMENSIONS



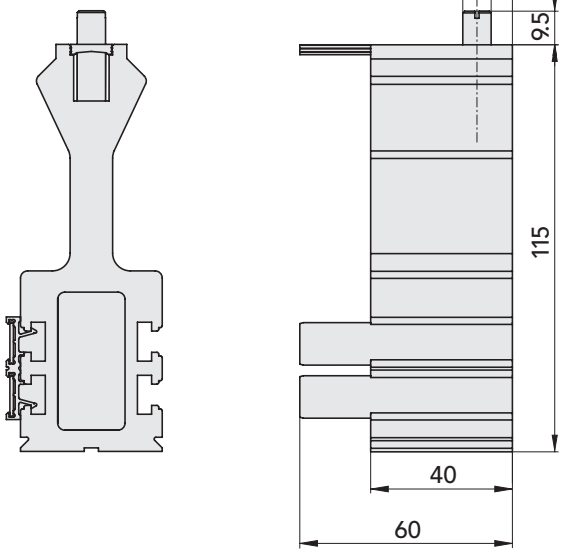
For power supply optional with cable and cable mounting

	Part no.
TracLink	MT57949

ACCESSORIES FOR TRACLINK

	Part no.
Power cable 10 m	MT57577
Power cable 30 m	MT57578
Base frame for TracLink tabletop	MT57431
for TracLink Single leg support	MT56817
for TracLink – TracLink Double leg support	MT58298
for TracLink – Trac Double leg support	MT58299
for TracLink 3-leg support	MT57948

TRACEND DIMENSIONS (end piece with open routing)



	Part no.
TracEnd	MT56788

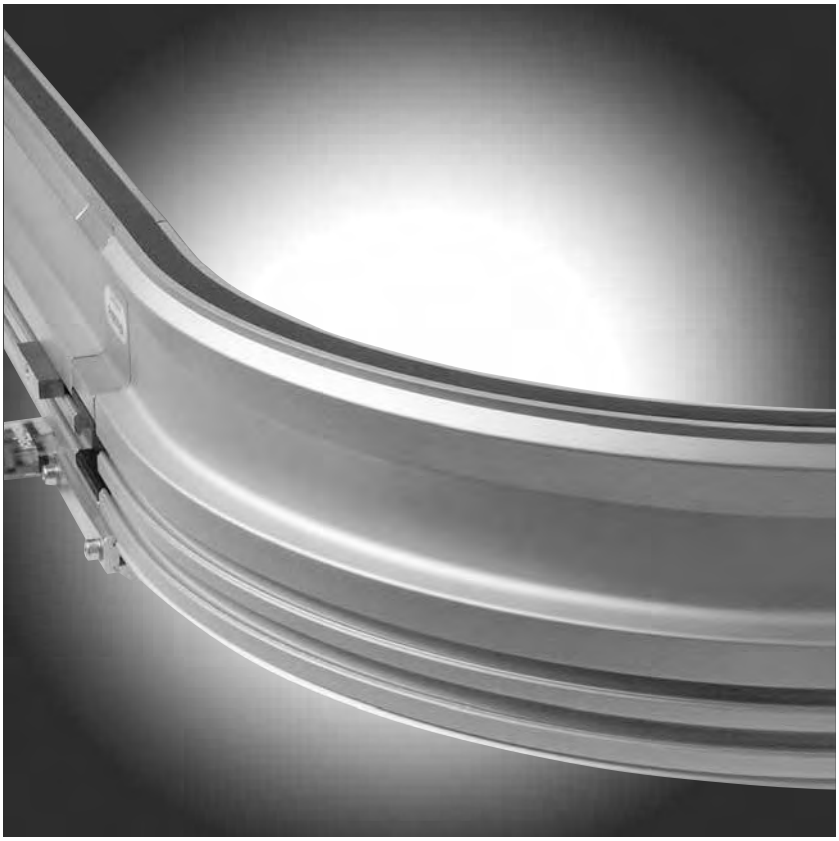
TRACCURVE

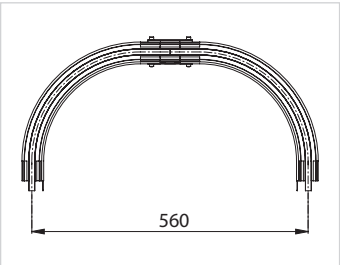
In the Montrac transport system, changes of Trac direction by 90° or 45° are realized by processed Tracs.

There are no shocks acting on the Shuttles when traveling through a TracCurve. The cross-section of TracCurve is identical to the Trac.

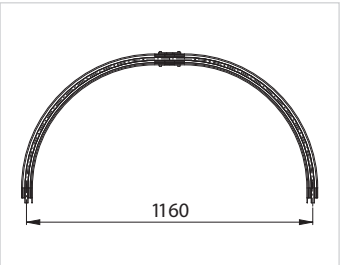
Using two 90° TracCurves, a 180° curve can be constructed.

The TracCurve R520 is used under certain special conditions, e.g. heavy product weight and extremely high sensitivity to vibrations.
The connection radius of 220 mm / 520 mm gives Montrac unparalleled flexibility.





2 x TracCurve 90°

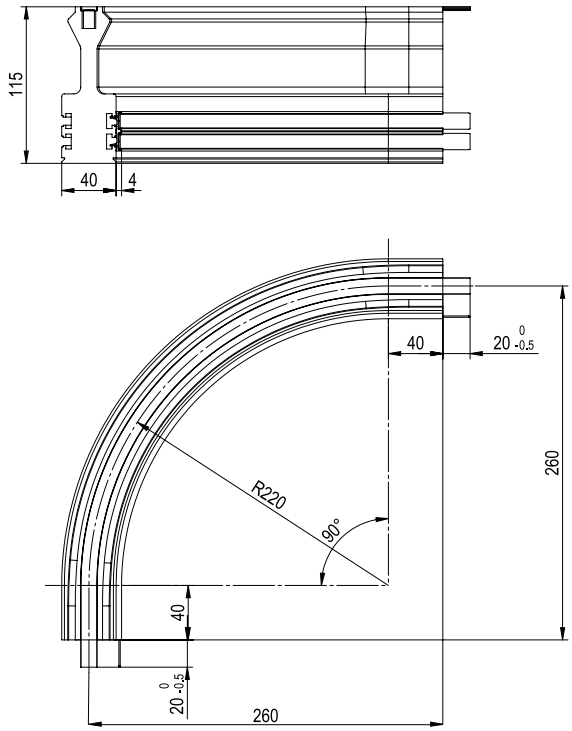


2 x TracCurve 90° R520

TRACCURVE SPECIFICATIONS

			90° R220	45° R220	90° R520	45° R520
Net weight		[kg]	2.3	1.4	5.0	2.8
Material			Aluminum, nickel-plated copper, plastic			
Nominal voltage		[V DC]	24			
Current carrying capacity		[A]	64			
Length tolerance		[mm]	±0.5			
Ambiance:	Temperature	[°C]	10 to 40			
	Rel. air humidity		5 % – 85 % (without condensation)			
	Air purity level		normal workshop ambiance			
Minimum requirement / compatibility			TracLink MT57949			

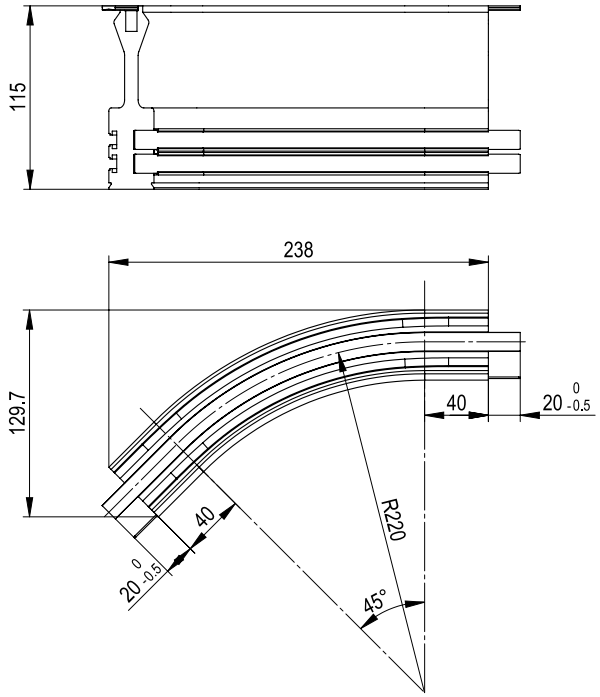
TRACCURVE 90° R220 DIMENSIONS



TracCurve R220	Part no.
90° R220 inside (conductor rail)	MT56095
90° R220 outside (conductor rail)	MT56096

Accessory for TracCurve 90° R220	Part no.
Base frame type L	MT56818
Base frame type T	MT56584

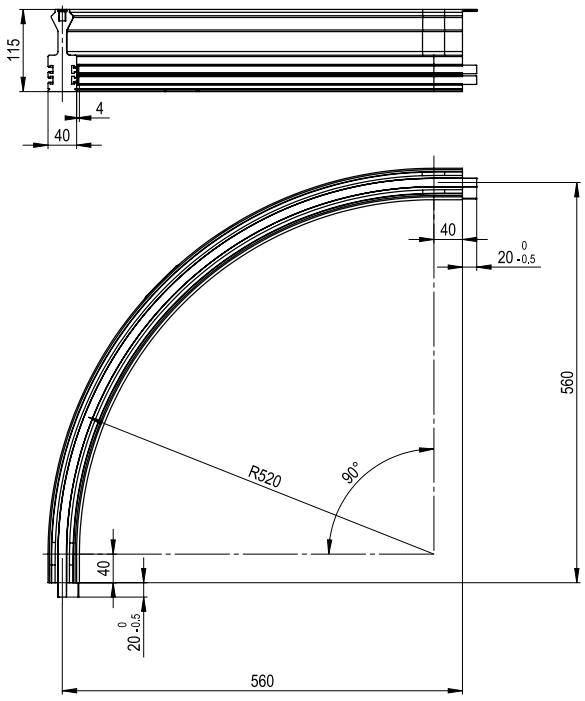
TRACCURVE 45° R220 DIMENSIONS



TracCurve R220	Part no.
45° R220 inside (conductor rail)	MT56097
45° R220 outside (conductor rail)	MT56098

Accessory for TracCurve 45° R220	Part no.
TracLink single leg support	MT56817

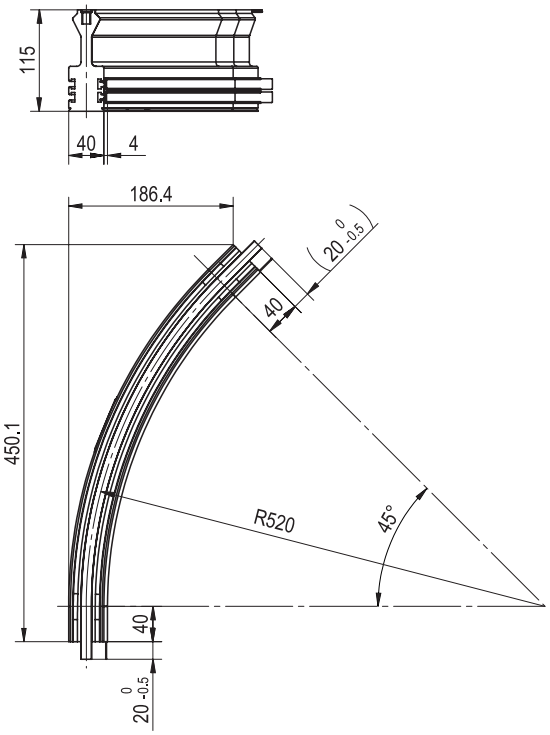
TRACCURVE 90° R520 DIMENSIONS



TracCurve R520	Part no.
90° R520 inside (conductor rail)	MT58201
90° R520 outside (conductor rail)	MT58207

Accessory for TracCurve 90° R520	Part no.
Base frame (90°)	MT58580
Base frame (180°)	MT58642

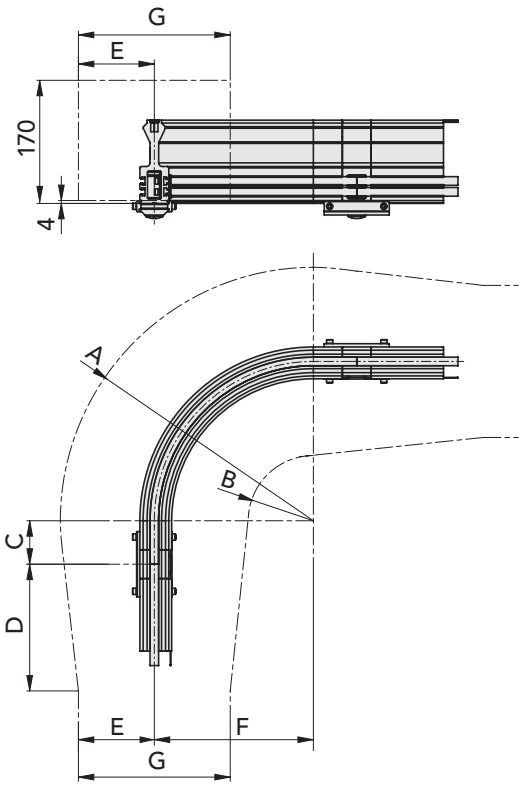
TRACCURVE 45° R520 DIMENSIONS



TracCurve R520	Part no.
45° R520 inside (conductor rail)	MT58202
45° R520 outside (conductor rail)	MT58208

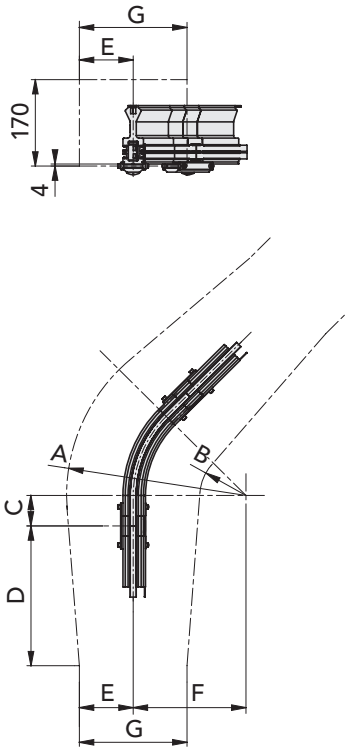
Accessory for TracCurve 45° R520	Part no.
Base frame	MT58589

FREE SPACE WITH PLATFORM DIMENSIONS 200 X 300 MM, 300 X 400 MM WITH A 90° TRACCURVE R220



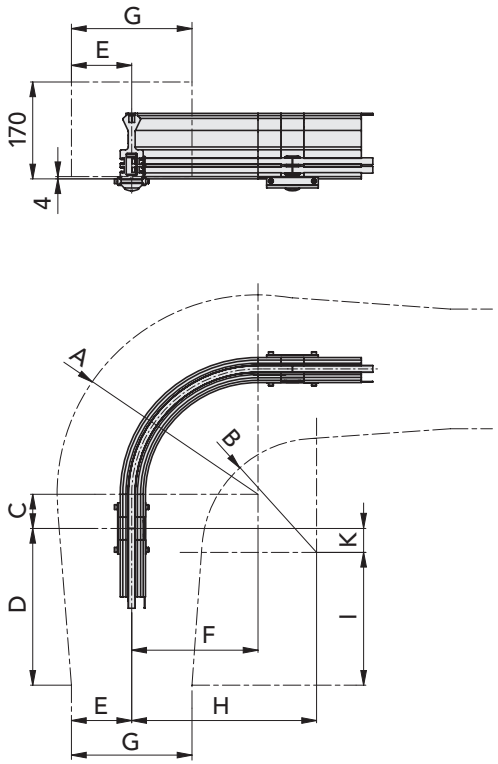
Platform dimensions [mm]	200 x 300	300 x 400
A	R350	R400
B	R90	R10
C	60	60
D	175	275
E	105	155
F	220	220
G	210	310

FREE SPACE WITH PLATFORM DIMENSIONS 200 X 300 MM, 300 X 400 MM WITH A 45° TRACCURVE R220



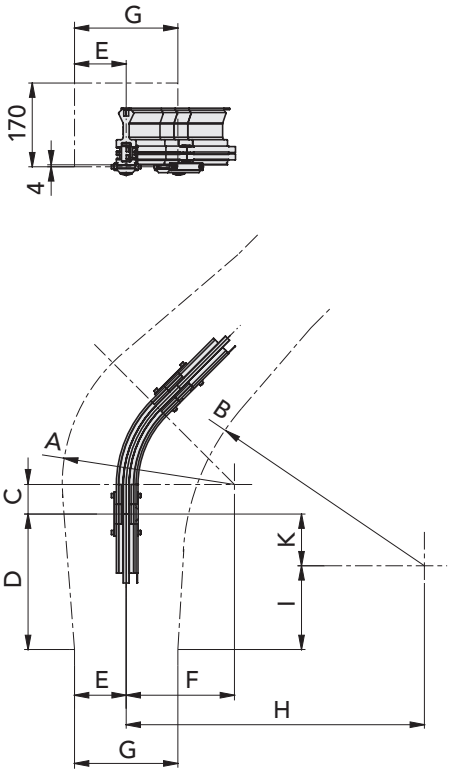
Platform dimensions [mm]	200 x 300	300 x 400
A	R350	R400
B	R90	R10
C	60	60
D	175	275
E	105	155
F	220	220
G	210	310

FREE SPACE WITH PLATFORM DIMENSIONS 200 X 400 MM, 200 X 550 MM, 300 X 550 MM WITH A 90° TRACCURVE R220



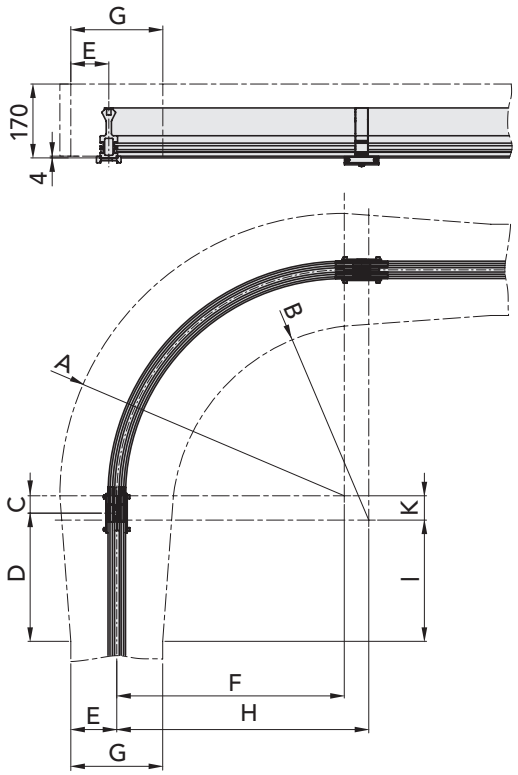
Platform dimensions [mm]	200 x 400	200 x 550	300 x 550
A	R350	R380	R410
B	R200	R300	R330
C	60	60	49
D	276	475	423
E	105	105	155
F	220	220	231
G	210	210	310
H	322	432	489
I	233	323	104
K	42	152	210

FREE SPACE WITH PLATFORM DIMENSIONS 200 X 400 MM, 200 X 550 MM, 300 X 550 MM WITH A 45° TRACCURVE R220



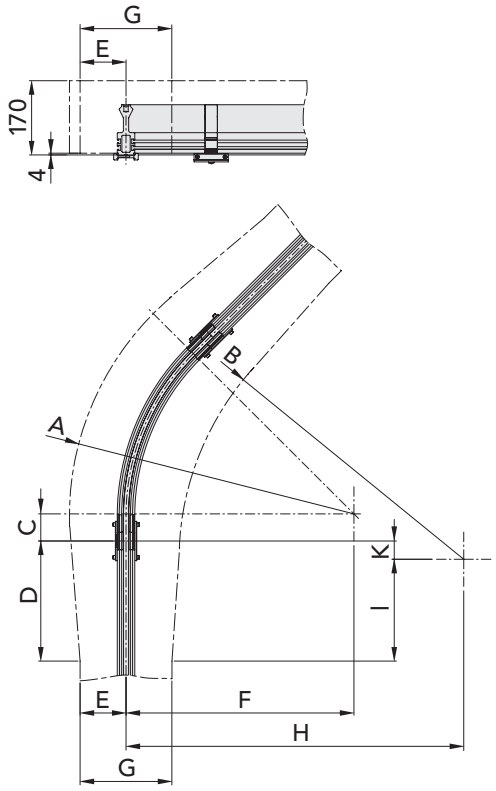
Platform dimensions [mm]	200 x 400	200 x 550	300 x 550
A	R350	R380	R410
B	R490	R800	R875
C	60	57	56
D	275	475	422
E	105	105	155
F	220	228	230
G	210	210	310
H	606	928	1031
I	170	242	38
K	105	233	276

FREE SPACE WITH SHUTTLE TRACCURVE 90° R520



Platform dimensions [mm]	200 x 300	200 x 400	200 x 550	300 x 400	300 x 550
A	R650	R650	R650	R690	R690
B	R450	R450	R500	R400	R450
C	40	40	40	49	50
D	295	295	295	381	379
E	105	105	108	155	153
F	520	520	517	511	512
G	210	210	210	310	310
H	576	576	619	575	622
I	279	279	233	255	210
K	16	16	62	15	59

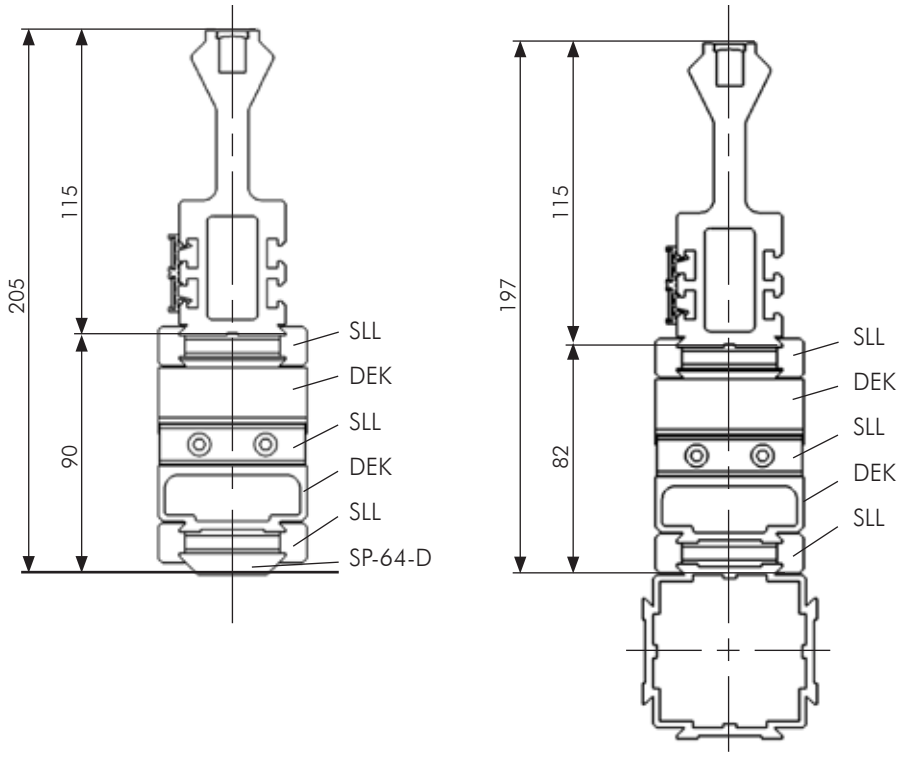
FREE SPACE WITH SHUTTLE TRACCURVE 45° R520



Platform dimensions [mm]	200 x 300	200 x 400	200 x 550	300 x 400	300 x 550
A	R650	R650	R650	R700	R700
B	R650	R650	R770	R600	R850
C	62	60	60	60	60
D	275	275	275	275	275
E	105	106	105	155	155
F	521	521	521	520	520
G	210	210	210	310	310
H	772	772	891	766	1013
I	233	233	184	233	134
K	42	42	91	42	141

ASSEMBLY EXAMPLE

The support between the rails and the base frame is usually at the TracLink.

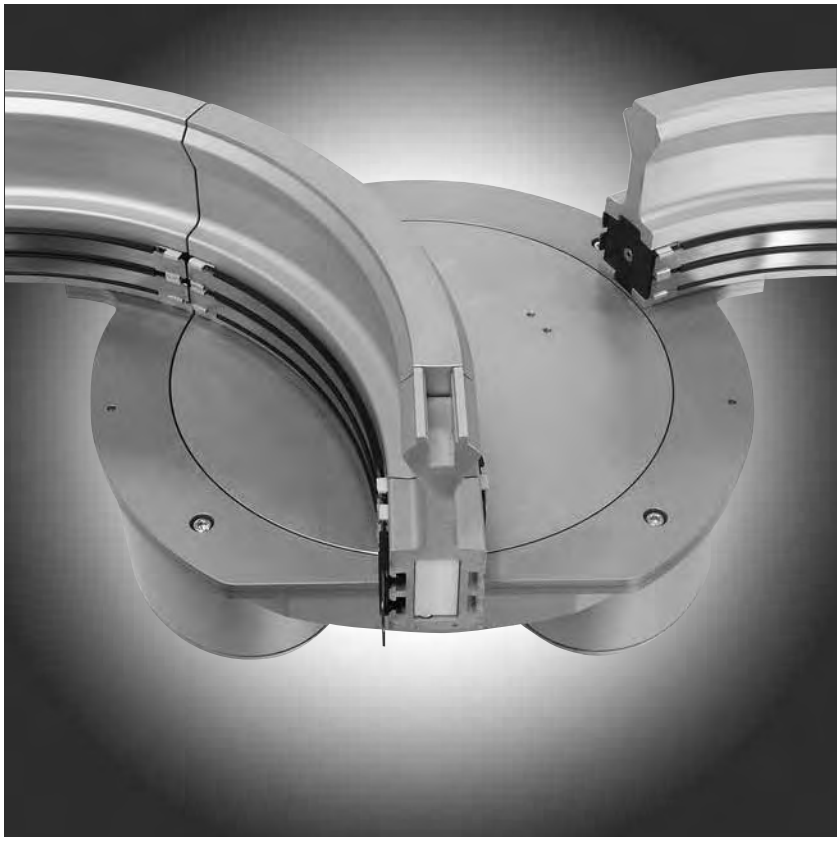


For more information about the components of the TracSet, please refer to chapter TracSet, starting on page 133.

TRACSWITCH

The TracSwitch is used to distribute Shuttles from one to two lanes or to collect Shuttles from two to one lane. Thanks to the narrow radii bypasses and branches can be realized in a confined space.

The TracSwitch is operated electrically and is powered directly from the conductor rails.



Delivery options:

– The TracSwitch can be ordered at montratec, readily mounted and configured according to the desired switch type.

– With the unconfigured TracSwitch the customer can assemble the conductor rails according to its application and can configure the TracSwitch himself.

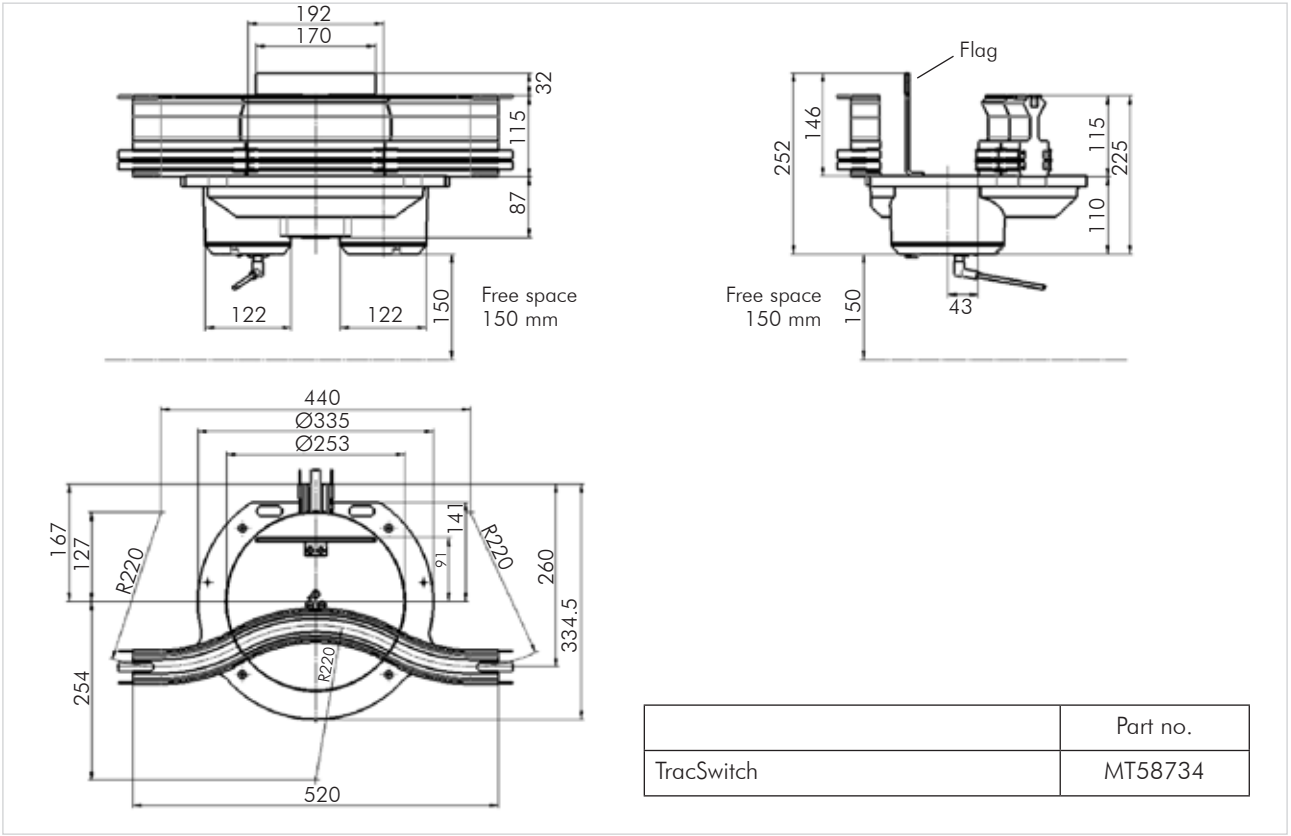
The TracSwitch Configurator can be downloaded from the website www.schmid-group.com.

TRACSWITCH SPECIFICATIONS

Net weight		[kg]	12
Material			Aluminum, nickel-plated copper, steel, brass, plastic
Nominal voltage		[V DC]	24 (min. 22.8 / max. 28.8)
Connections			1 x RS232 3 x DIN (per position used 1 x DIN) 4 x DOT (per position used 1 x DOT + 1 x Error)
Rotation angle		[°]	3 x 120
Rotation time (120°) Rotation time (240°)		[sec] [sec]	1.2 1.7
Torque of the rotary plate		[Nm]	3.8
Current carrying capacity: – between the Trac connections – on the movable Trac section		 [A] [A]	 40 2.5
Mechanical load capacity		[N]	340*
Ambiance:	Temperature Rel. air humidity Air purity level	[°C]	10 to 40 5 % – 85 % (without condensation) normal workshop ambiance
Minimum requirement / compatibility			TracLink MT57949

* corresponds to the weight of a fully loaded Twin-Axle Shuttle.

TRACSWITCH DIMENSIONS



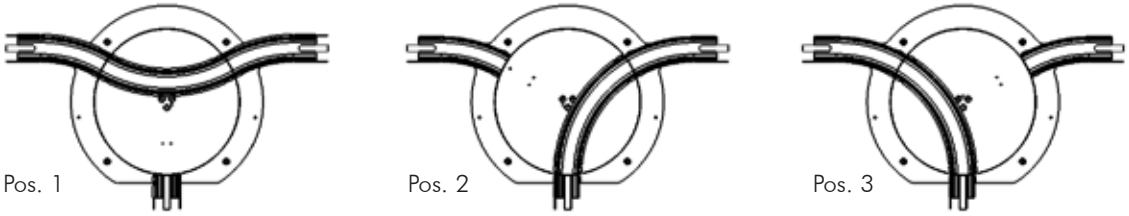
	Part no.
TracSwitch	MT58734

ACCESSORIES FOR TRACSWITCH

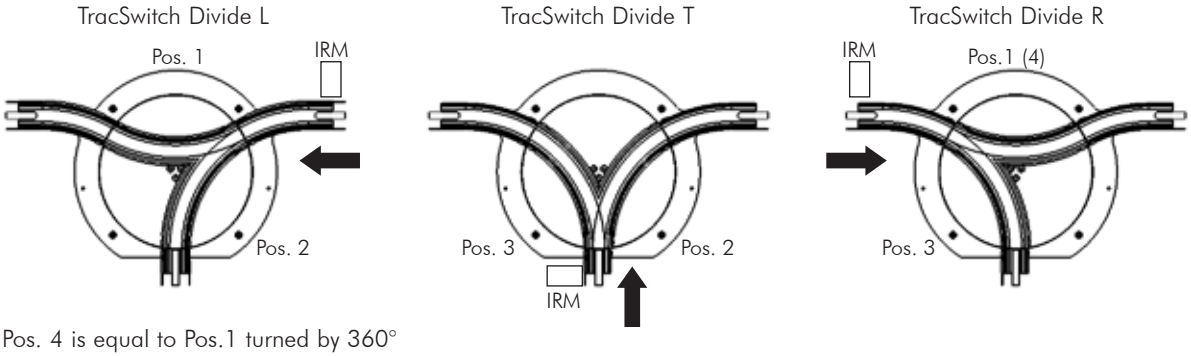
	Part no.
Configuration by montratec	MT56935
PC connection cable	MT506157
Flag for TracSwitch	MT57456
Base frame type T	MT56584
Base frame for double TracSwitch	MT56826
Base frame type H	MT58230

OVERVIEW OF TRACSWITCH TYPES

The TracSwitch has three possible positions. Based on these possibilities, the TracSwitch can be used as a "TracSwitch Divide" distributor switch or as a "TracSwitch Collect" merge switch.

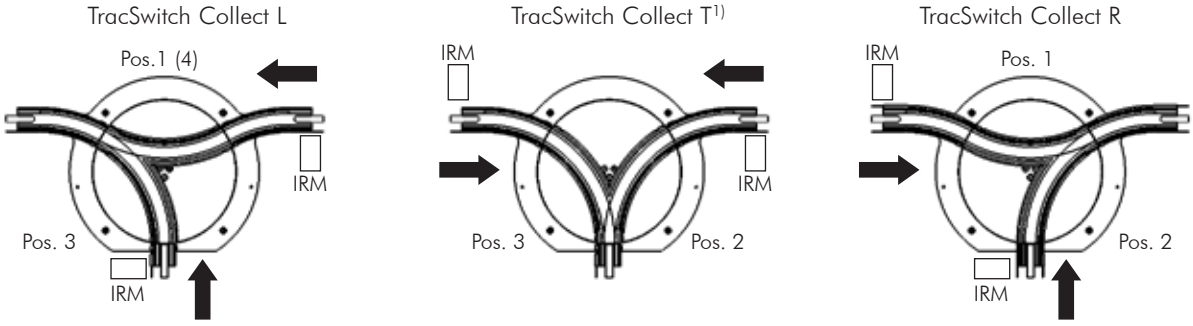


TRACSWITCH DIVIDE TYPES



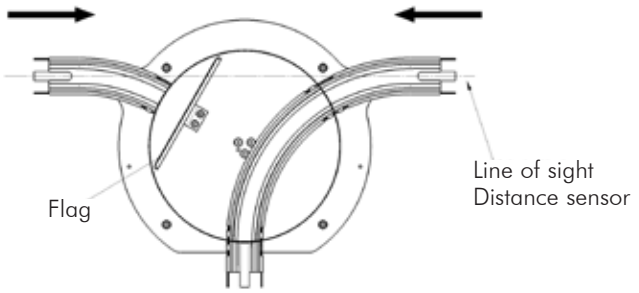
Pos. 4 is equal to Pos.1 turned by 360°
Depending on the application, different TracSwitch positions are necessary.

TRACSWITCH COLLECT TYPES



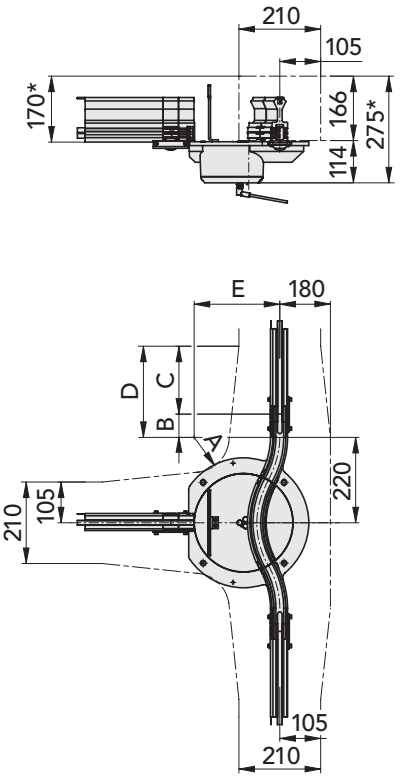
Pos. 4 is equal to Pos.1 turned by 360°
Depending on the application, different TracSwitch positions are necessary.

1) TracSwitch Collect T



An additional flag (part no. MT57456) must be mounted on the TracSwitch Collect T, since the Shuttles move toward each other and may blind each other with the distance sensor (this could lead to faults).

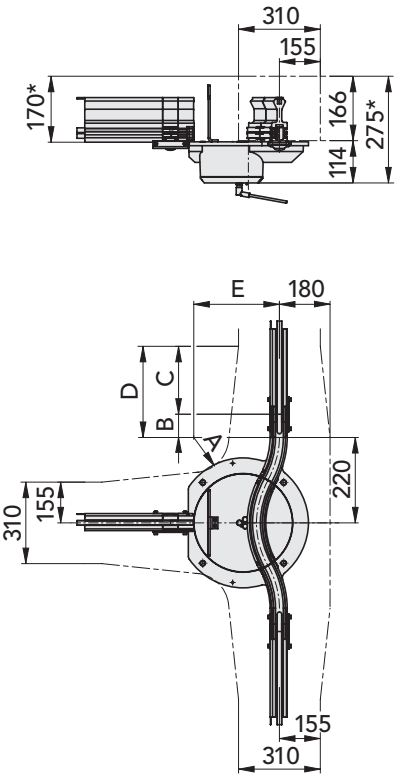
FREE SPACE FOR SHUTTLES WITH PLATFORM DIMENSIONS 200 X 300 MM, 200 X 400 MM, 200 X 550 MM



* Depending on the load the free space will need to be increased upward.

Platform dimensions [mm]	200 x 300	200 x 400	200 x 550
A	R90	R60	R300
B	60	60	165
C	175	275	260
D	235	335	425
E	220	220	445

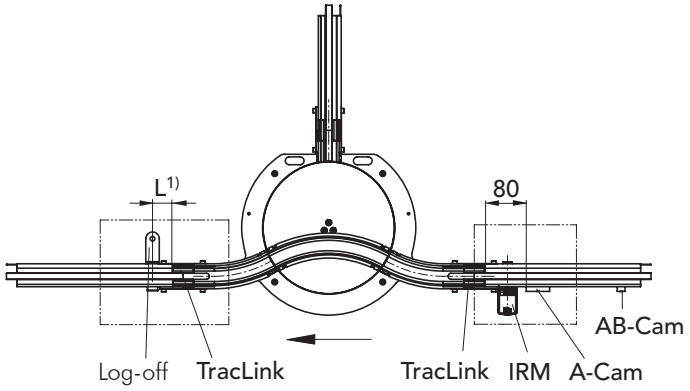
FREE SPACE FOR SHUTTLES WITH PLATFORM DIMENSIONS 300 X 400 MM, 300 X 550 MM



* Depending on the load the free space will need to be increased upward.

Platform dimensions [mm]	300 x 400	300 x 550
A	R10	R300
B	60	200
C	275	225
D	425	335
E	220	480

CYCLE TIMES TRACSWITCH STRAIGHT ON



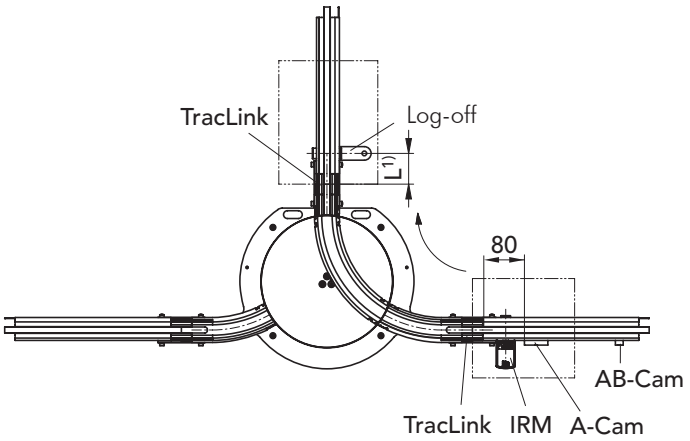
The times mentioned below apply only to the configurations listed in the drawings and to the acceleration times listed below. The dimensions shown in the drawings are minimum dimensions for which the manufacturer can guarantee trouble-free operation.

CYCLE TIMES

	Shuttle L=300 mm L1) = 40 mm		Shuttle L=400 mm L1) = 160 mm		Shuttle L=550 mm L1) = 330 mm		Twin-Axle Shuttle Shuttle L=550 mm L1) = 330 mm	
	Additional load		Additional load		Additional load		Additional load	
Passage at	without [s]	max [s]	without [s]	max [s]	without [s]	max [s]	without [s]	max [s]
v = 30 m/min	2.1	2.3	2.3	2.6	2.6	2.9	2.7	2.9
v = 12 m/min	4.2	4.5	4.8	5.1	5.7	5.8	5.7	5.9

1) The measurements for L assume a log-off of the Shuttle at a falling signal at the log-off sensor.
For a log-off of the Shuttle at a rising signal of the log-off sensor the value for L need to be increased by 70 mm each time.

CYCLE TIMES TRACSWITCH CURVE



The times mentioned below apply only to the configurations listed in the drawings and to the acceleration times listed below. The dimensions shown in the drawings are minimum dimensions for which the manufacturer can guarantee trouble-free operation.

CYCLE TIMES

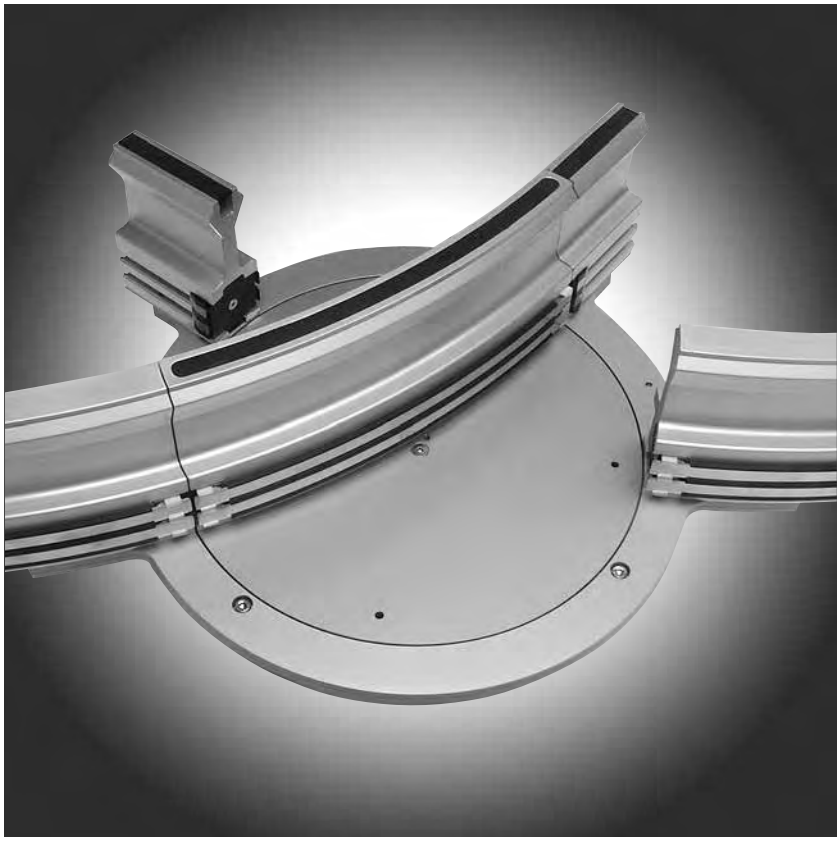
	Shuttle L=300 mm L[1] = 125 mm		Shuttle L=400 mm L[1] = 225 mm		Shuttle L=550 mm L[1] = 375 mm		Twin-Axle Shuttle Shuttle L=550 mm L[1] = 375 mm	
	Additional load		Additional load		Additional load		Additional load	
Passage at	without [s]	max [s]	without [s]	max [s]	without [s]	max [s]	without [s]	max [s]
v = 30 m/min	2.0	2.2	2.2	2.4	2.5	2.8	2.6	2.7
v = 12 m/min	4.0	4.2	4.4	4.6	5.2	5.4	5.4	5.5

[1] The measurements for L assume a log-off of the Shuttle at a falling signal at the log-off sensor.
For a log-off of the Shuttle at a rising signal of the log-off sensor the value for L need to be increased by 70 mm each time.

TRACSWITCH ARENA

The TracSwitch Arena either diverts Shuttles into a bypass or allows them to continue on the main lane. The TracSwitch Arena makes it possible to perform a complete bypass with a single component.

The TracSwitch Arena is operated electrically and is powered directly from the conductor rails.



Delivery options:

– The TracSwitch Arena can be ordered mounted and ready configured, according to the desired switch type, at montratec.

– With the unconfigured TracSwitch Arena the customer can assemble the conductor rails according to his application and can configure the TracSwitch Arena himself.

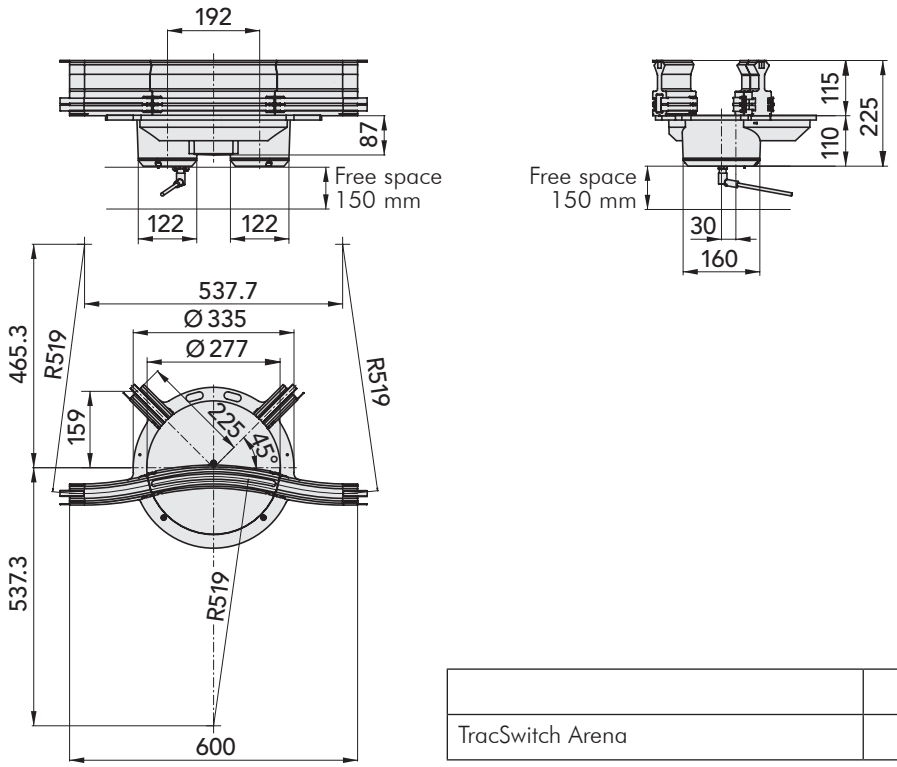
The TracSwitch Configurator can be downloaded from the website www.schmid-group.com.

TRACSWITCH ARENA SPECIFICATIONS

Net weight		[kg]	13.5
Material			Aluminum, nickel-plated copper, steel, brass, plastic
Nominal voltage		[V DC]	24
Connections			1 x RS232 3 x DIN (per position used 1 x DIN) 4 x DOT (per position used 1 x DOT + 1 x Error)
Rotation angle		[°]	60, 150, 210
Rotation time (60°, 150°, 210°)		[sec]	60°=0.5s, 150°=1s, 210°=1.5s
Torque of the rotary plate		[Nm]	3.8
Current carrying capacity: – between the Trac connections – on movable Trac section		 [A] [A]	 40 2.5
Mechanical load capacity		[N]	340*
Ambiance:	Temperature Rel. air humidity Air purity level	[°C]	10 to 40 5 % – 85 % (without condensation) normal workshop ambiance
Minimum requirement / compatibility			TracLink MT57949

* corresponds to the weight of a fully loaded Twin-Axle Shuttle.

TRACSWITCH ARENA DIMENSIONS

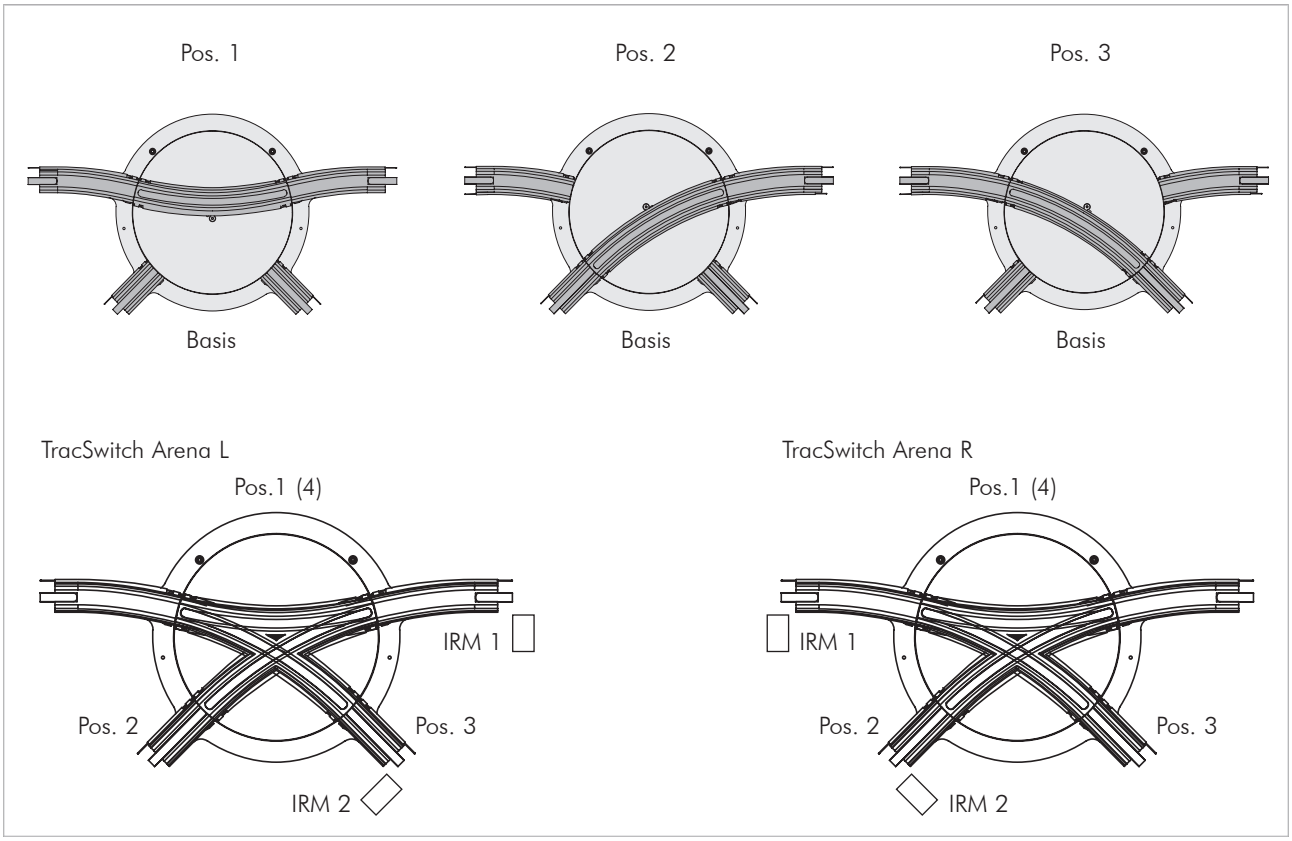


	Part no.
TracSwitch Arena	MT58879

ACCESSORIES FOR TRACSWITCH ARENA

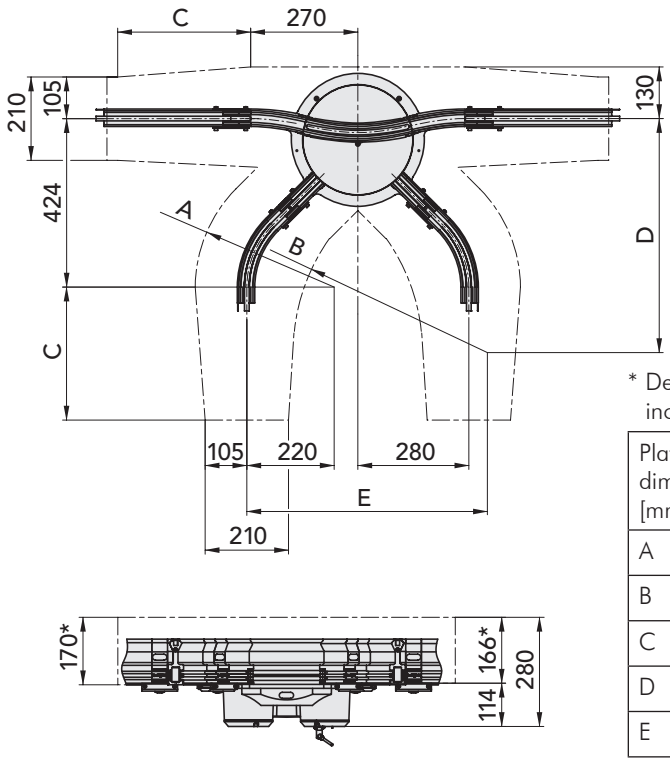
	Part no.
Configuration by montratec	MT56935
PC connection cable	MT506157
Base frame	MT57671

OVERVIEW OF TRACSWITCH ARENA – POSITIONS AND TYPES



The desired TracSwitch Arena type can be configured with the "Motor Configurator" software.
The latest version can be downloaded from the website www.schmid-group.com.
Pos. 4 is equal to Pos.1 turned by 360°

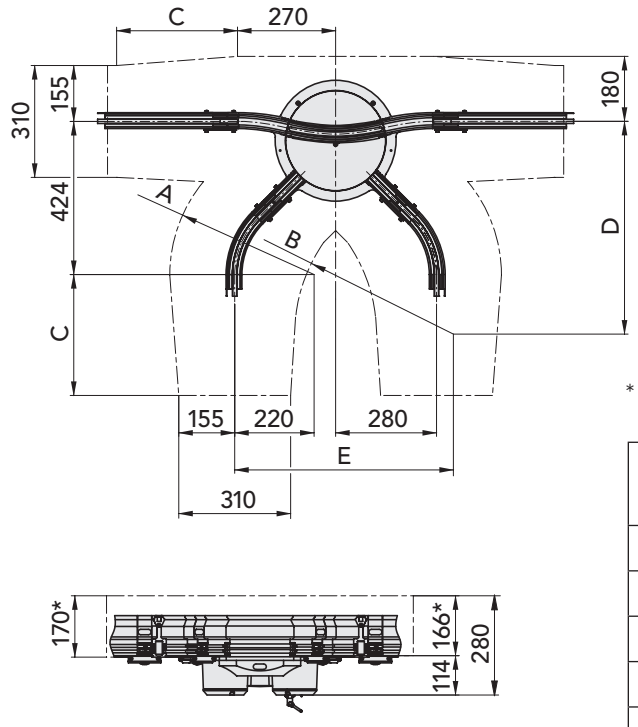
FREE SPACE FOR SHUTTLES WITH PLATFORM DIMENSIONS 200 X 300 MM, 200 X 400 MM, 200 X 550 MM



* Depending on the load the free space will need to be increased upward.

Platform dimensions [mm]	200 x 300	200 x 400	200 x 550
A	R350	R350	R380
B	R90	R490	R800
C	235	335	475
D	424	590	715
E	220	606	928

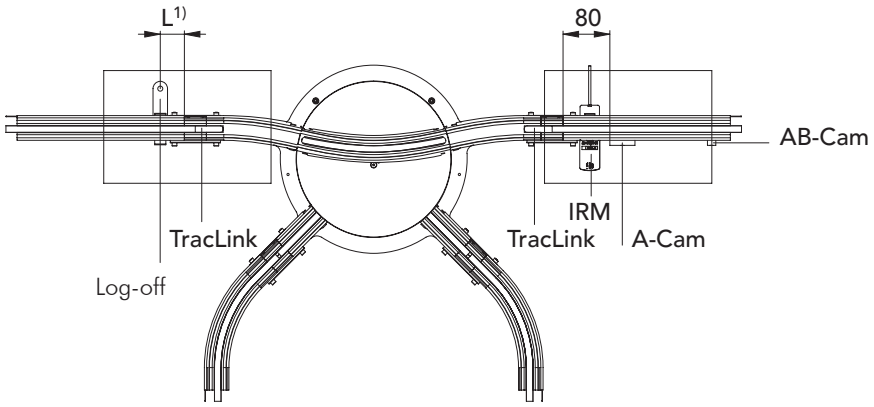
FREE SPACE FOR SHUTTLES WITH PLATFORM DIMENSIONS 300 X 400 MM, 300 X 550 MM



* Depending on the load the free space will need to be increased upward.

Platform dimensions [mm]	300 x 400	300 x 550
A	R400	R410
B	R440	R875
C	335	475
D	590	757
E	606	1031

CYCLE TIMES FOR TRACSWITCH ARENA STRAIGHT ON



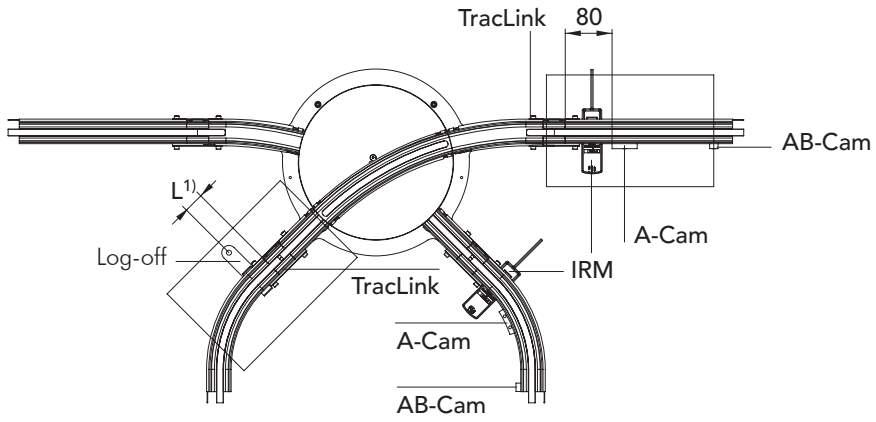
The times mentioned below apply only to the configurations listed in the drawings and to the acceleration times listed below. The dimensions shown in the drawings are minimum dimensions for which the manufacturer can guarantee trouble-free operation.

CYCLE TIMES

	Shuttle L=300 mm L[1] = 40 mm		Shuttle L=400 mm L[1] = 160 mm		Shuttle L=550 mm L[1] = 330 mm		Twin-Axle Shuttle Shuttle L=550 mm L[1] = 330 mm	
	Additional load		Additional load		Additional load		Additional load	
Passage at	without [s]	max [s]	without [s]	max [s]	without [s]	max [s]	without [s]	max [s]
v = 30 m/min	1.8	2.0	2.0	2.3	2.3	2.6	2.4	2.7
v = 12 m/min	3.7	4.1	4.3	4.8	5.0	5.6	5.3	5.6

[1] The measurements for L assume a log-off of the Shuttle at a falling signal at the log-off sensor.
For a log-off of the Shuttle at a rising signal of the log-off sensor the value for L need to be increased by 70 mm each time.

CYCLE TIMES FOR TRACSWITCH ARENA CURVE



The times mentioned below apply only to the configurations listed in the drawings and to the acceleration times listed below. The dimensions shown in the drawings are minimum dimensions for which the manufacturer can guarantee trouble-free operation.

CYCLE TIMES

	Shuttle L=300 mm L[1] = 125 mm		Shuttle L=400 mm L[1] = 225 mm		Shuttle L=550 mm L[1] = 375 mm		Twin-Axle Shuttle Shuttle L=550 mm L[1] = 375 mm	
	Additional load		Additional load		Additional load		Additional load	
Passage at	without [s]	max [s]	without [s]	max [s]	without [s]	max [s]	without [s]	max [s]
v = 30 m/min	1.7	1.9	2.0	2.2	2.3	2.6	2.4	2.7
v = 12 m/min	3.6	4.0	4.1	4.4	4.8	5.3	5.0	5.4

[1] The measurements for L assume a log-off of the Shuttle at a falling signal at the log-off sensor.
For a log-off of the Shuttle at a rising signal of the log-off sensor the value for L need to be increased by 70 mm each time.

TRACCROSSING

The TracCrossing makes it possible for two lanes to intersect each other at a right angle.

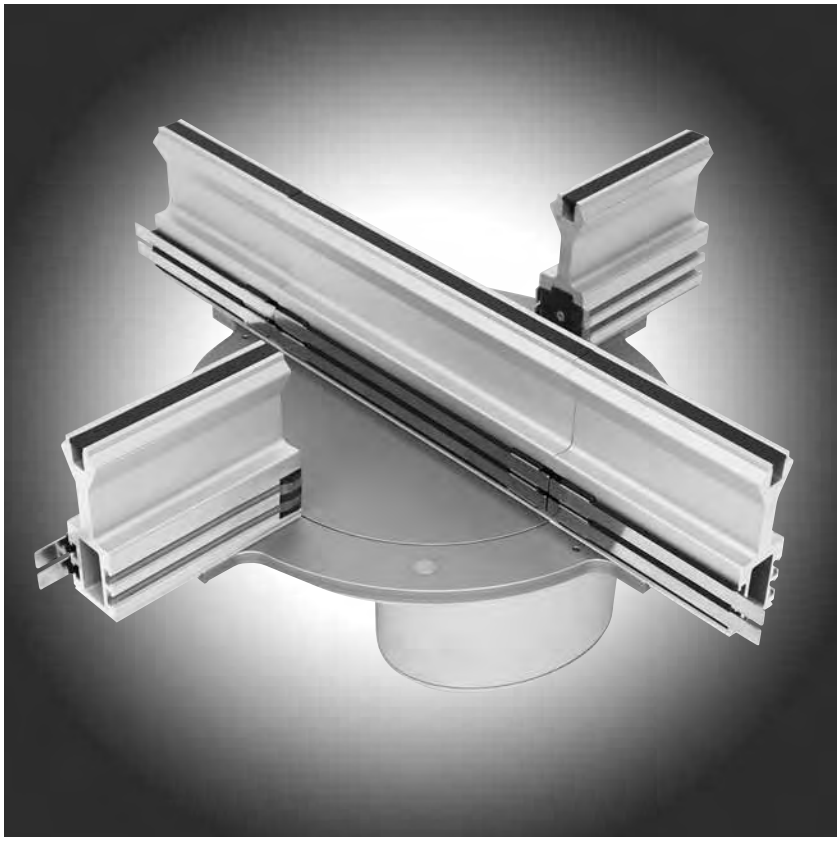
The electrical power is supplied directly from the conductor rails.

Delivery options:

– The TracCrossing can be ordered at montratec, mounted and configured.

– The configuration of the unconfigured TracCrossing can be done by the customer himself.

The TracCrossing Configurator can be downloaded from the website www.schmid-group.com.

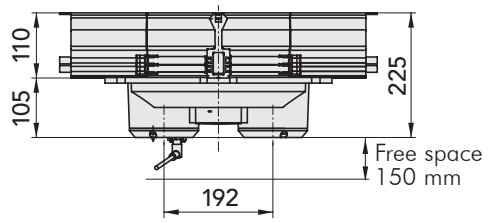


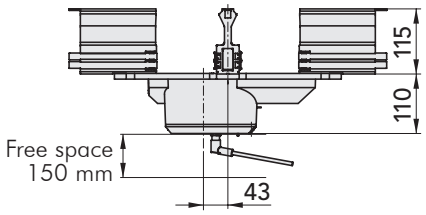
TRACCROSSING SPECIFICATIONS

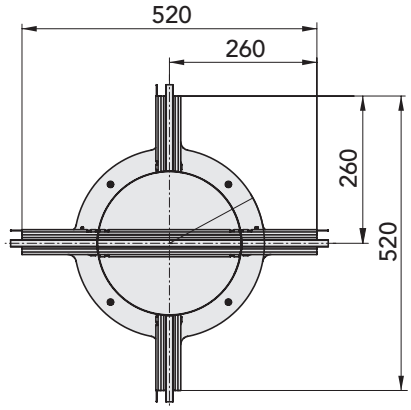
Net weight		[kg]	12
Material			Aluminum, nickel-plated copper, steel, brass, plastic
Nominal voltage		[V DC]	24
Connections			1 x RS232 2 x DIN (per position used 1 x DIN) 3 x DOT (per position used 1 x DOT + 1 x Error)
Rotation angle		[°]	90
Rotation time (90°)		[sec]	1.4
Torque of the rotary plate		[Nm]	3.8
Current carrying capacity: – between the Trac connections – on the movable Trac section		 [A] [A]	 40 2.5
Mechanical load capacity		[N]	340*
Ambiance:	Temperature Rel. air humidity Air purity level	[°C]	10 to 40 5 % – 85 % (without condensation) normal workshop ambiance
Minimum requirement / compatibility			TracLink MT57949

* corresponds to the weight of a fully loaded Twin-Axle Shuttle.

TRACCROSSING DIMENSIONS







	Part no.
TracCrossing	MT58864

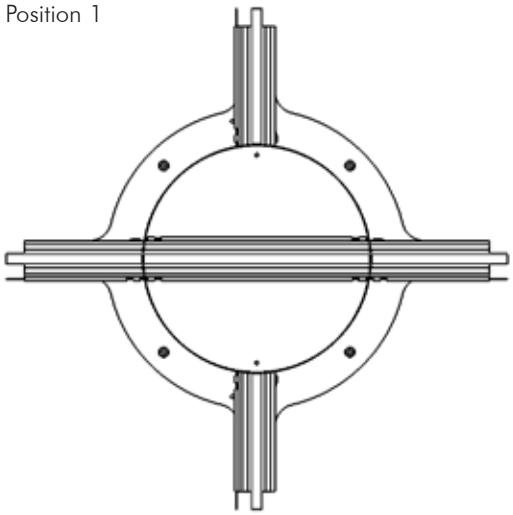
ACCESSORIES FOR TRACCROSSING

	Part no.
Configuration by montratec	MT56935
PC connection cable	MT506157
Base frame type T	MT56584
Single leg support	MT56817

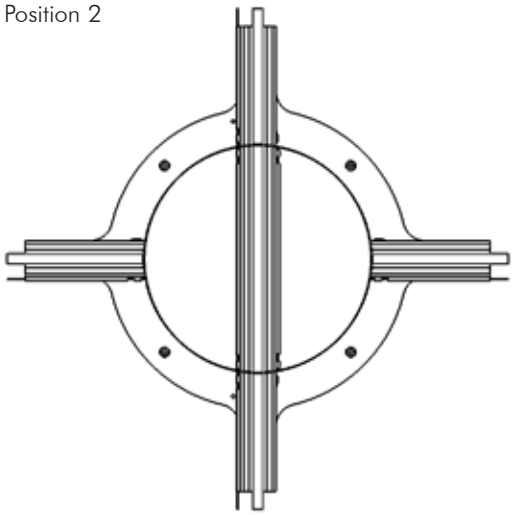
POSITIONS OF TRACCROSSING

The TracCrossing has two possible positions.

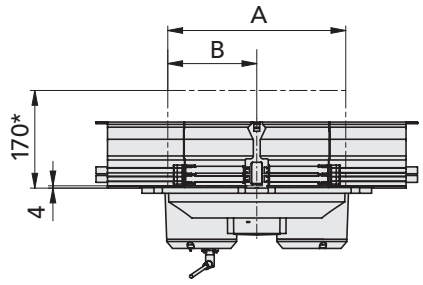
Position 1

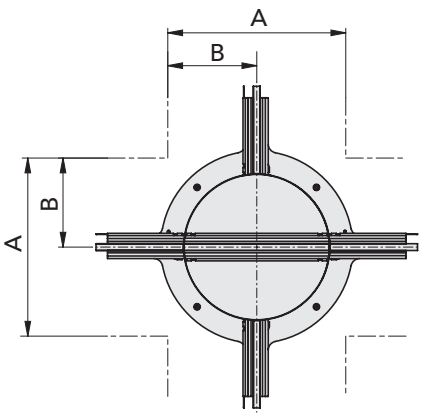


Position 2



FREE SPACE FOR SHUTTLES WITH PLATFORM WIDTHS 200 MM, 300 MM

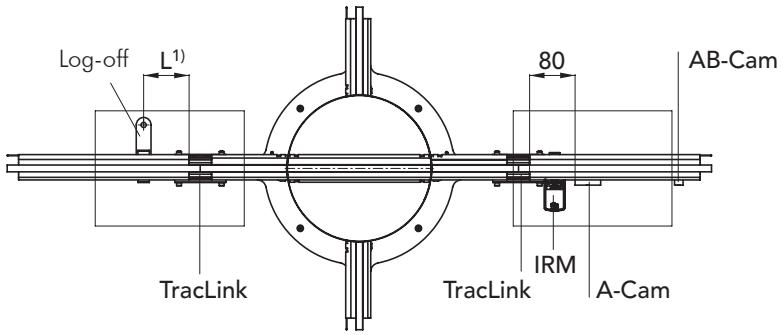




* Depending on the load the free space will need to be increased upward.

Free space	200 mm	300 mm
A	210	310
B	105	155

CYCLE TIMES FOR TRACCROSSING



The times mentioned below apply only to the configurations listed in the drawings and to the acceleration times listed below. The dimensions shown in the drawings are minimum dimensions for which the manufacturer can guarantee trouble-free operation.

CYCLE TIMES

	Shuttle L=300 mm L[1] = 80 mm		Shuttle L=400 mm L[1] = 180 mm		Shuttle L=550 mm L[1] = 350 mm		Twin-Axle Shuttle Shuttle L=550 mm L[1] = 350 mm	
	Additional load		Additional load		Additional load		Additional load	
	without	max	without	max	without	max	without	max
Passage at	[s]	[s]	[s]	[s]	[s]	[s]	[s]	[s]
v = 30 m/min	2.1	2.4	2.3	2.6	2.7	2.9	2.7	2.9
v = 12 m/min	4.3	4.5	4.8	5.1	5.7	5.8	5.7	5.9

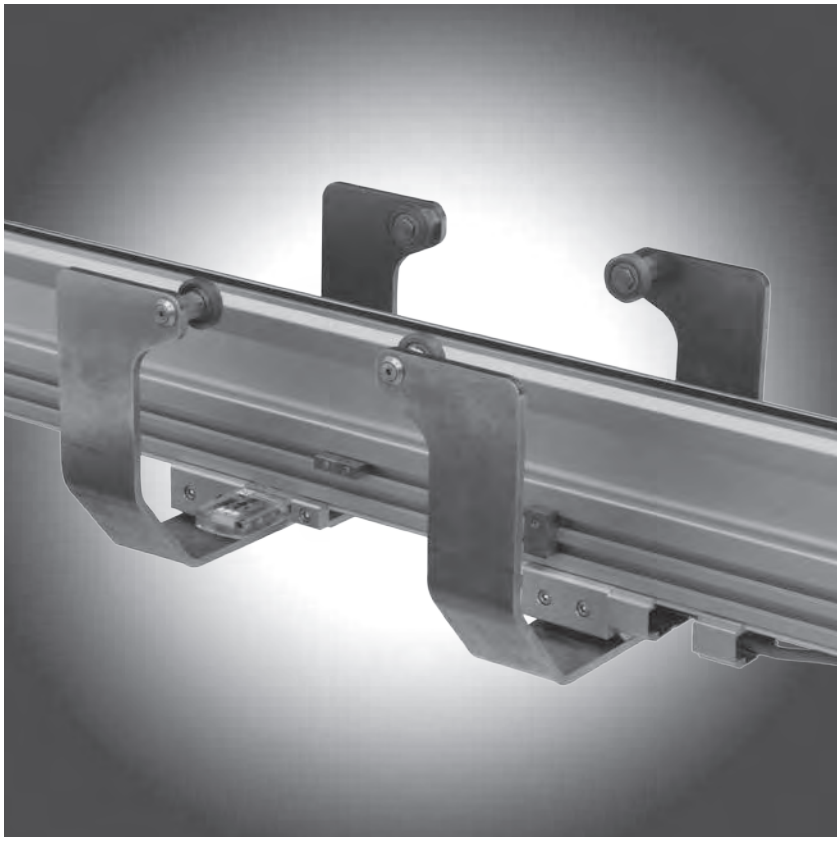
[1] The measurements for L assume a log-off of the Shuttle at a falling signal at the log-off sensor.
For a log-off of the Shuttle at a rising signal of the log-off sensor the value for L need to be increased by 70 mm each time.

SUPOTRAC

The SupoTrac serves as a product support at machining stations to prevent the Shuttle from being influenced by outside forces. The ShuttleLock included in the scope of delivery prevents the Shuttle from being moved manually out of the IRMs operating area during processing.

The SupoTrac is not suitable for stations with press operations.

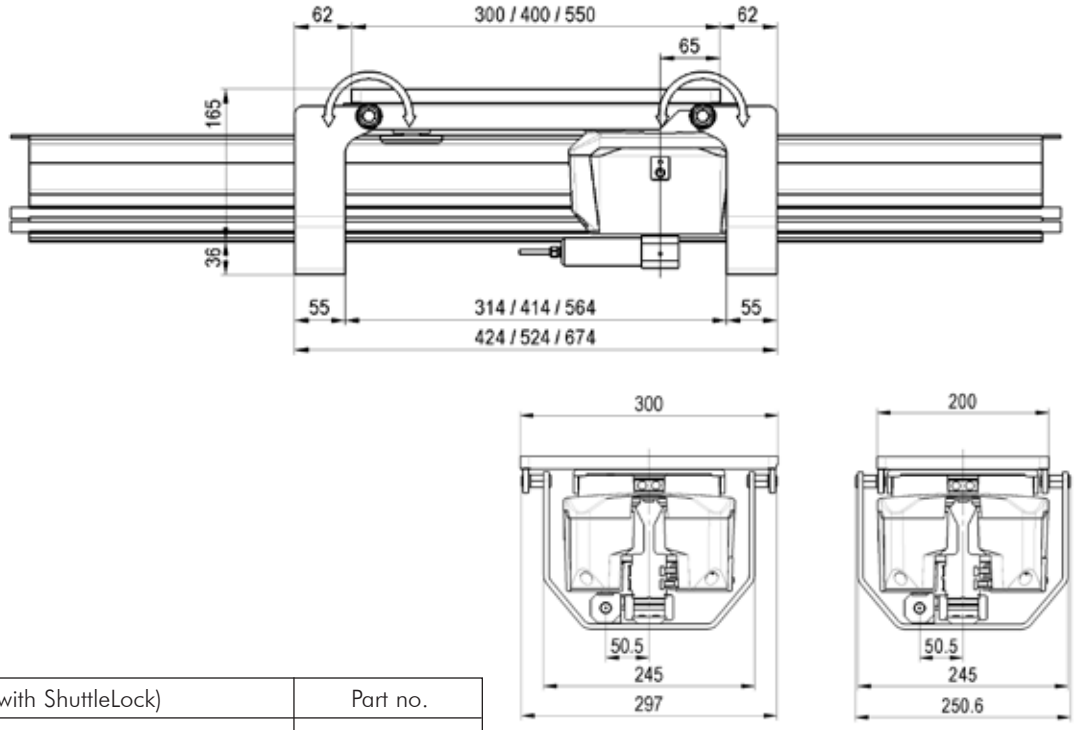
The SupoTrac further makes no claims concerning ergonomics or safety regulations for manual workstations.



SUPOTRAC SPECIFICATIONS

Net weight		[kg]	4.2
Connection voltage (ShuttleLock)		[V DC]	24
Current consumption (ShuttleLock)		[A]	0.5
Material			aluminum, copper, plastic, brass, steel, rubber
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 % – 85 % (without condensation)
	Air purity level		normal workshop ambiance

SUPOTRAC DIMENSIONS

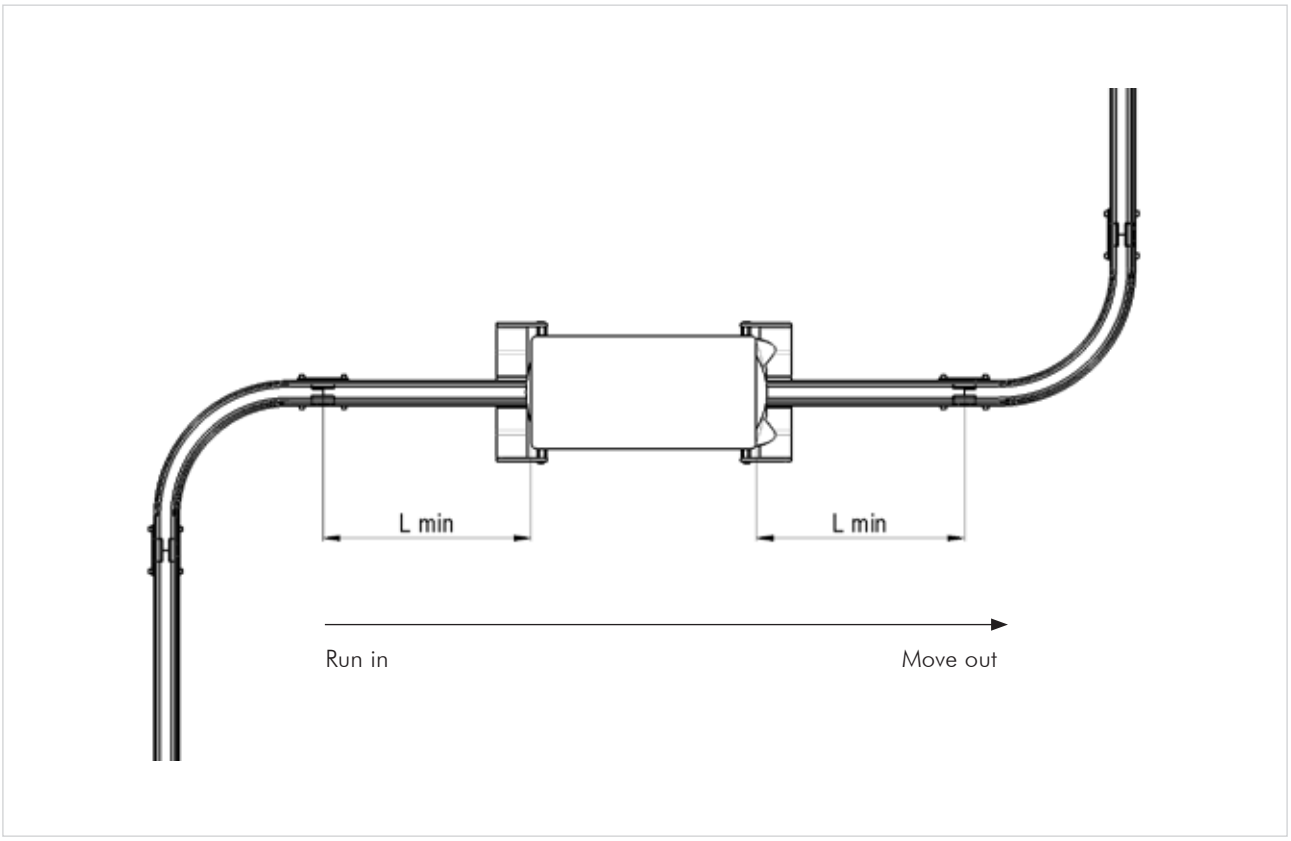


SupoTrac (with ShuttleLock)	Part no.
for platform widths 200 and 300	MT56933

ACCESSORIES FOR SUPOTRAC

	Part no.
Single leg support	MT56817
TracLink / plate base frame	MT57431
Connection cable 5 m, with straight socket on one side	MT504610
Connection cable 5 m, with angled socket on one side	MT504929
Connection cable 10 m, with straight socket on one side	MT507528
Connection cable 10 m, with angled socket on one side	MT507529
Proximity switch M4, PNP, with cable and connector S8 (for ShuttleLock)	MT520292

MINIMUM DISTANCE UNTIL CHANGE OF DIRECTION



GAPS

Shuttle	Shuttle L=300 mm	Shuttle L=400 mm	Shuttle L=550 mm	Twin-Axle Shuttle
Run-in L min.	95 mm	195 mm	345 mm	325 mm
Move out L min.	95 mm	195 mm	345 mm	345 mm

ERGOTRAC

With the ErgoTrac a manual workstation can be set up more ergonomically. The workpiece platform is tilted 25° towards the operator. This makes the platform ergonomically more easily accessible and improves the visibility.

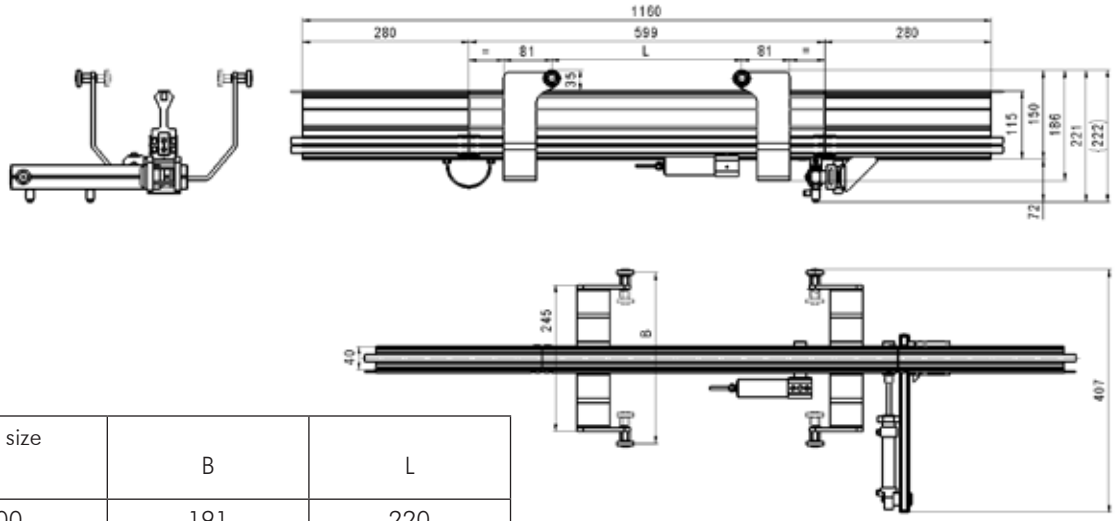
The ErgoTrac replaces a normal track piece at a length of 1160 m. By means of the ShuttleLock, the Shuttle is secured against movement while manual work is performed. A simple support (SupoTrac) absorbs the forces that result from an operation taking place on the Shuttle.

The ErgoTrac can only be used for the Shuttle L=300mm and L=400mm.

ERGOTRAC SPECIFICATIONS

Net weight		[kg]	12
Tilting time			See table "tilting times"
Tilt angle		[°]	25
Operating pressure		[bar]	3-6
Nominal pressure		[bar]	5
Air consumption at 5 bar		[cm^3/cycle]	144.6
Pneumatic connection			Hose Ø 4/6 mm, Ø 2.7/4 mm
Driving medium			5 μm filtered, oiled or unoiled air
End position monitoring			Magnetically actuated cylinder switches
Life time			> 10^7 switching operations
Material			Aluminum, nickel-plated copper, plastic, brass Steel, bronze
Nominal voltage		[V DC]	24
Current carrying capacity:			
– between the Trac connections		[A]	40
– on the movable Trac section		[A]	2.5
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 % – 85 % (without condensation)
	Air purity level		normal workshop ambiance
Max. load (without Shuttle, incl. platform)		[kg]	
	Shuttle with length L = 300 mm		13.2
	Shuttle with length L = 400 mm		12.9

ERGOTRAC DIMENSIONS



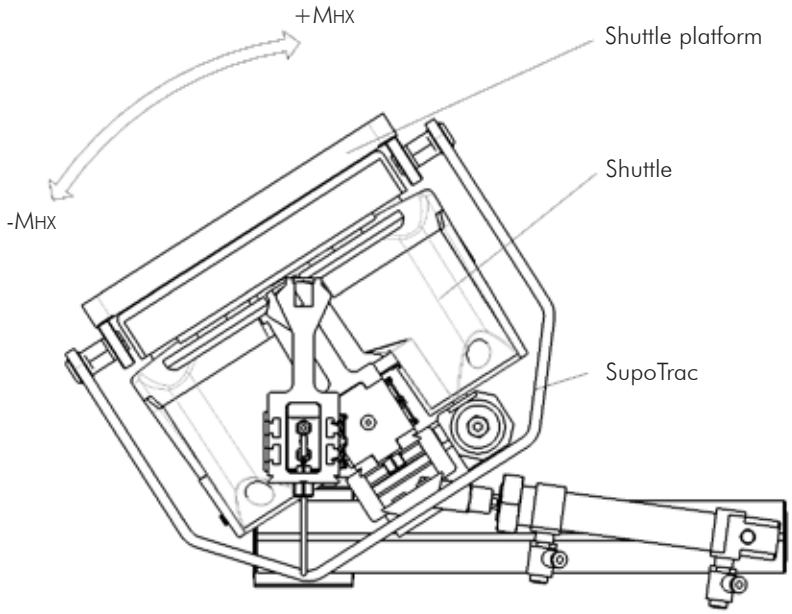
Platform size (mm)	B	L
200 x 300	191	220
200 x 400	191	320
300 x 400	287	320

ErgoTrac (with ShuttleLock)	Part no.
for platform width 200 mm and 300 m	MT56952

ACCESSORIES FOR ERGOTRAC

	Part no.
Single leg support	MT56817
Support for ErgoTrac	MT58594
Base frame for TracLink/tabletop	MT57431
Base frame for Trac/tabletop	MT54819
Cylinder switch, PNP, pluggable (for cylinder)	MT506885
Connection cable 5 m, with straight socket on one side	MT504610
Connection cable 5 m, with angled socket on one side	MT504929
Connection cable 10 m, with straight socket on one side	MT507528
Connection cable 10 m, with angled socket on one side	MT507529
Proximity switch M4, PNP, with cable and connector S8 (for ShuttleLock)	MT520292

HOLDING MOMENTS OF THE TILTING MOVEMENT (AT 5 BAR)



The holding moments may be utilized only when the Shuttle platform is appropriately supported.

HOLDING MOMENTS

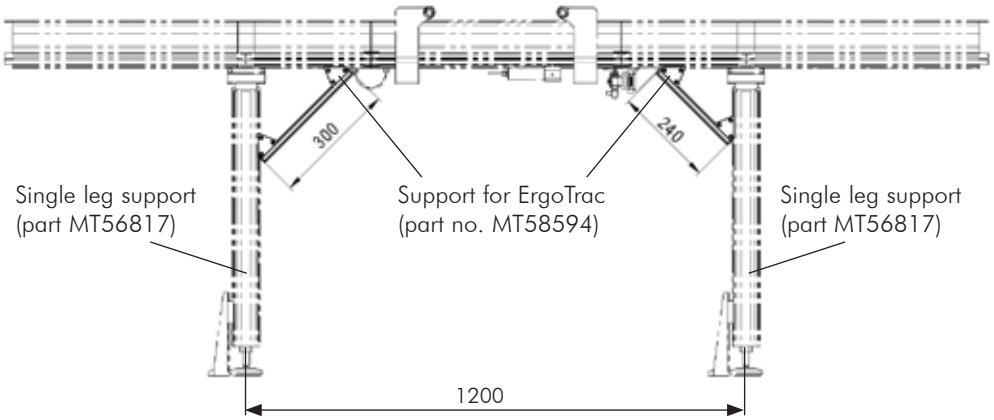
Holding moments	In horizontal position	In inclined position
+MHX	13 Nm	13 Nm
– MHX	13 Nm	10 Nm

TILTING TIMES

Direction of movement	Shuttle load	Tilting time [s]	Throttle position – on piston rod side	Throttle position on drive cylinder – on piston bottom side
From horizontal to inclined position	Empty	1.1	–	Open by 1 revolution
	Full	1.1	–	Open by 1 revolution
From inclined to horizontal position	Empty	1.1	Open by 1 revolution	–
	Full	1.1	Open by 1 revolution	–

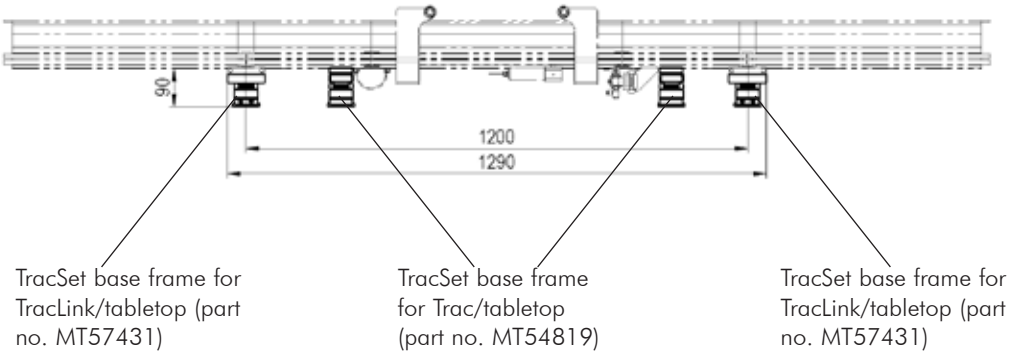
SUPPORT ON A TRACSET PROFILE BASE FRAME

Support by means of single leg supports (part no. MT56817) and support for ErgoTrac (part no. MT58594)



SUPPORT ON A TABLETOP USING TRACSET

Support on tabletop by means of a TracSet frame base for Trac/tabletop (part no. MT54819) and TracSet base frame for TracLink/tabletop (part no. MT57431)



POSITIONINGUNIT PU-4

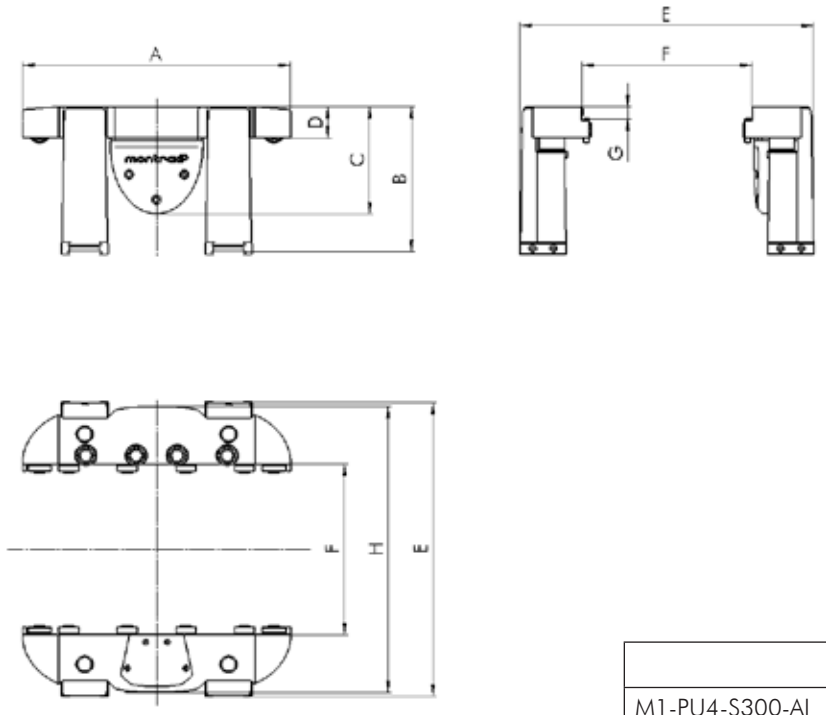
The PositioningUnit PU-4 is used when a Shuttle is to be precisely positioned and/or when the platform must be additionally supported during the machining operation.

There are versions for single and multiple positioning (SPU-4 and MPU-4). Both versions are available in various sizes, corresponding to the standard platform dimensions.

POSITIONINGUNIT PU-4 SPECIFICATIONS (pneumatic)

PositioningUnit for platform length		300 mm single	300 mm multiple	400 mm single	400 mm multiple	550 mm single	550 mm multiple
Net weight	[kg]	8	9	9	11	11	14
Positioning accuracy							
– horizontal (x- and y-direction)	[mm]	± 0.02	± 0.03	± 0.02	± 0.03	± 0.02	± 0.03
– vertical (z-direction)	[mm]	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Length	[mm]	321	411	411	556	556	761
Operating pressure	[bar]	3-6					
Nominal pressure	[bar]	5					
Air consumption PU	[cm^3]	10 / double stroke (at 5 bar)					
Pneumatic connection		for hose with Ø 4 mm					
Material		aluminum, steel, bronze					
Driving medium		5 μm filtered, oiled or unoiled air					
Ambiance: Temperature	[°C]	10 to 40					
Rel. air humidity		5 % – 85 % (without condensation)					
Air purity level		normal workshop ambiance					

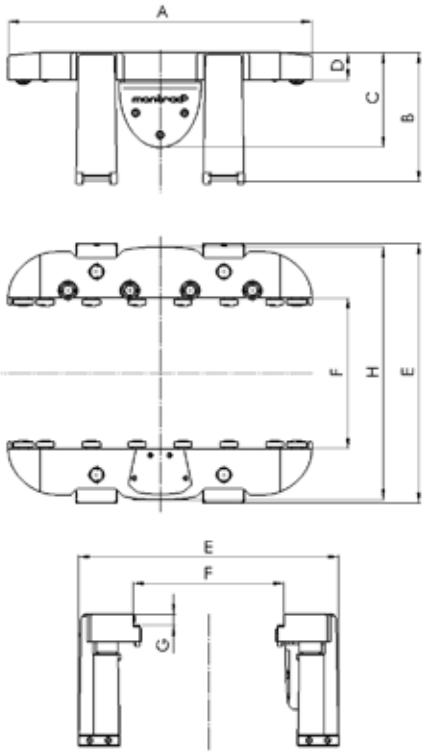
POSITIONINGUNIT M1-PU4-S300-AI DIMENSIONS



Platform dimension [mm]	200 x 300
A	321
B	174
C	128
D	37
E	351
F	204
G	14.5
H	342

	Part no.
M1-PU4-S300-AI	MT65092

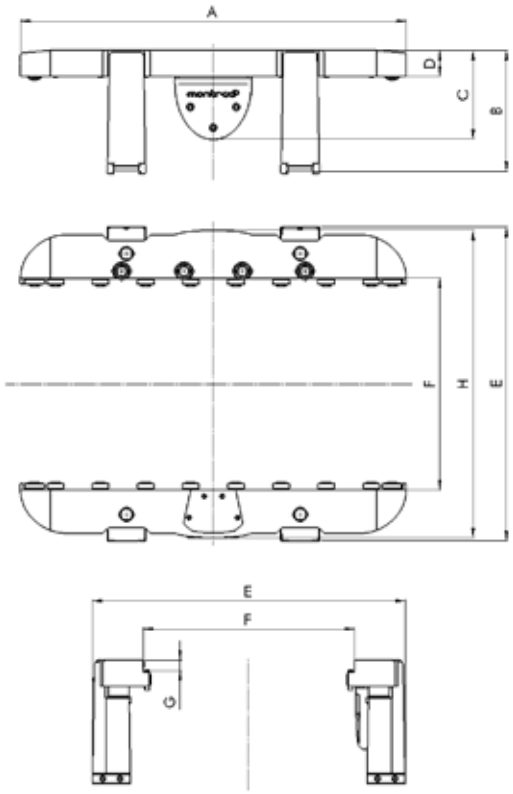
POSITIONINGUNIT M1-PU4-S400M300-AI DIMENSIONS



Platform dimensions [mm]	SPU-4 200 x 400	SPU-4 300 x 400	MPU-4 200 x 300
A	411	411	411
B	174	174	174
C	128	128	128
D	37	37	37
E	351	451	351
F	204	304	204
G	14.5	14.5	14.5
H	342	442	342

	Part no.
M1-PU4-S400M300-AI	MT65093

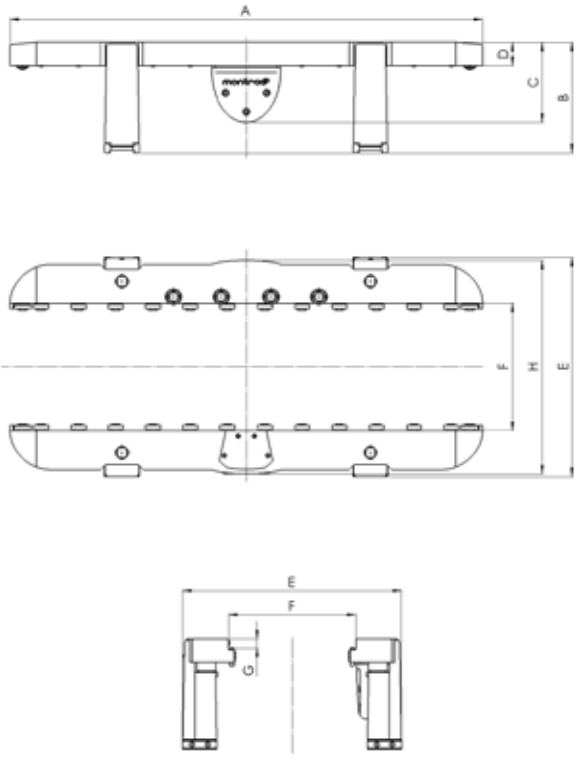
POSITIONINGUNIT M1-PU4-S550M400-AI DIMENSIONS



Platform dimensions [mm]	SPU-4 200 x 550	SPU-4 300x 550	MPU-4 200x 400	MPU-4 300x 400
A	556	556	556	556
B	174	174	174	174
C	128	128	128	128
D	37	37	37	37
E	351	451	351	451
F	204	304	204	304
G	14.5	14.5	14.5	14.5
H	342	442	342	442

	Part no.
M1-PU4-S550M400-AI	MT65094

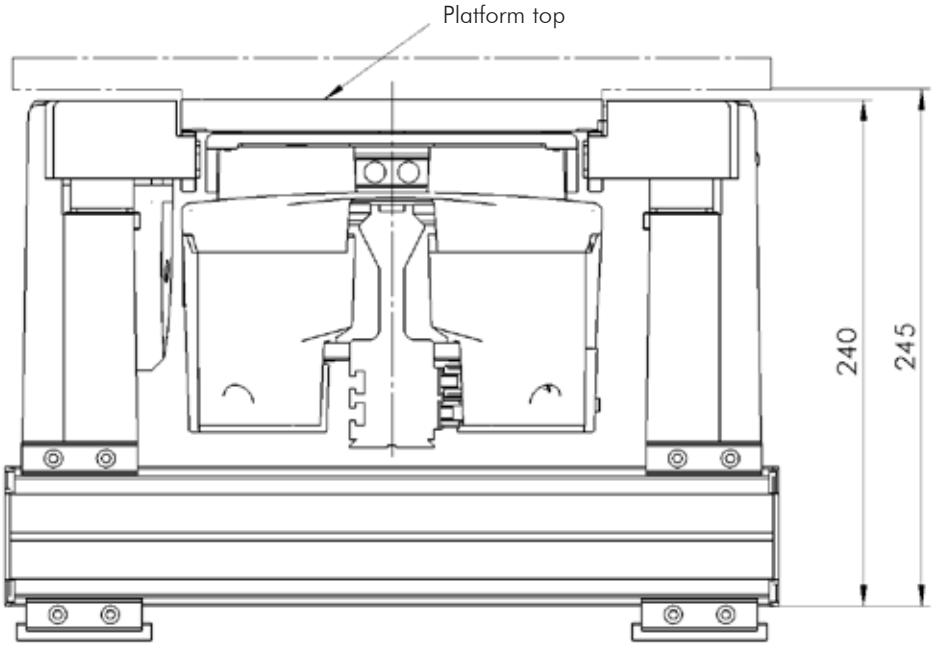
POSITIONINGUNIT M1-PU4-M550-AI DIMENSIONS



Platform dimensions [mm]	MPU-4 200 x 550	MPU-4 300 x 550
A	761	761
B	174	174
C	128	128
D	37	37
E	351	451
F	204	304
G	14.5	14.5
H	342	442

	Part no.
M1-PU4-M550-AI	MT65095

WORKING HEIGHT



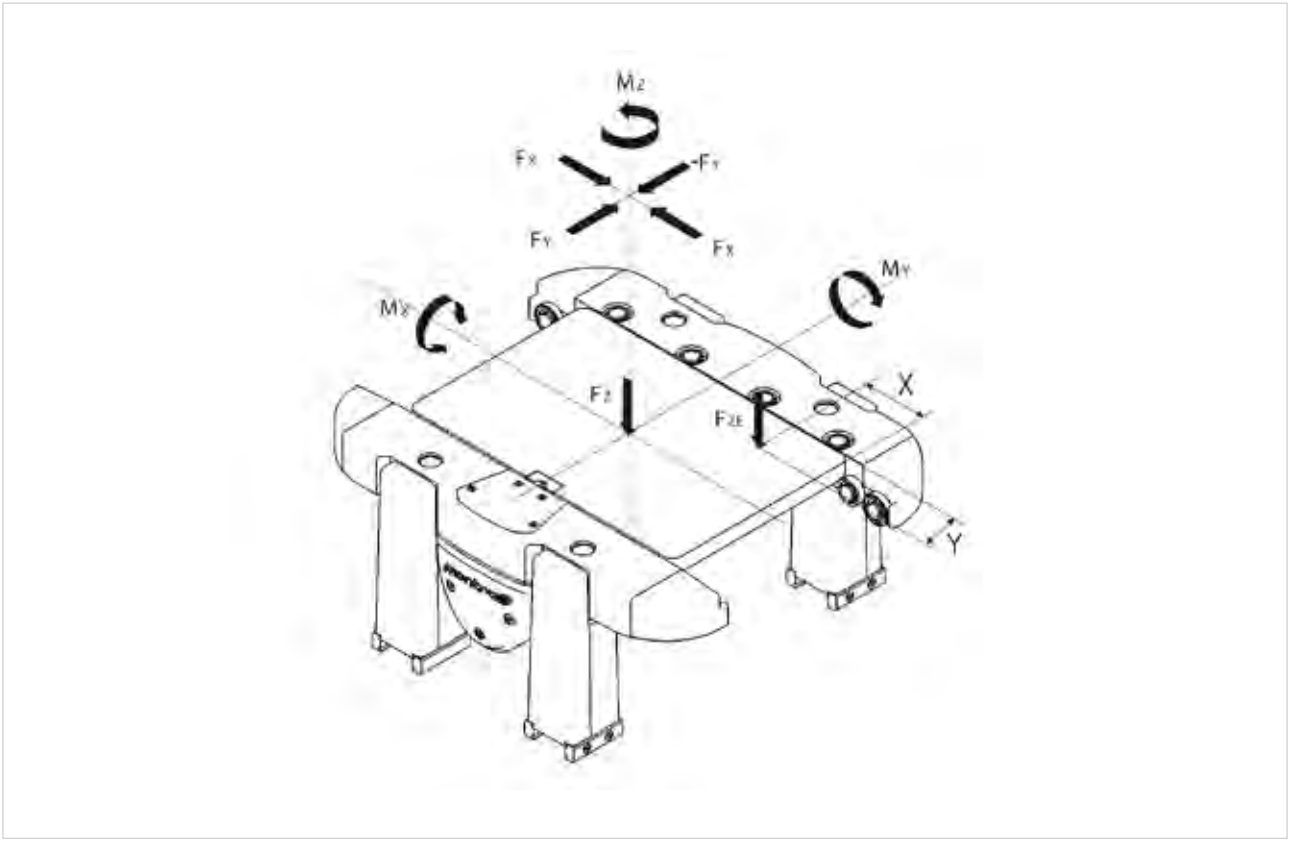
POSITIONINGUNIT

Platform length [mm]	Positioning	Description	Part no.
300	single	M1-PU4-S300-AI	MT65092
400	single	M1-PU4-S400M300-AI	MT65093
550	single	M1-PU4-S550M400-AI	MT65094
300	multiple	M1-PU4-S400M300-AI	MT65093
400	multiple	M1-PU4-S550M400-AI	MT65094
550	multiple	M1-PU4-M550-AI	MT65095

ACCESSORIES FOR POSITIONINGUNIT PU-4

	Part no.
Adjust gauge for width 200 mm	MT65171
Adjust gauge for width 300 mm	MT65173
Connection cable 5 m, with straight socket on one side	MT504610
Connection cable 5 m, with angled socket on one side	MT504929
Connection cable 10 m, with straight socket on one side	MT507528
Connection cable 10 m, with angled socket on one side	MT507529
Proximity switch Ø 6.5, PNP, with cable 2 m	MT508842

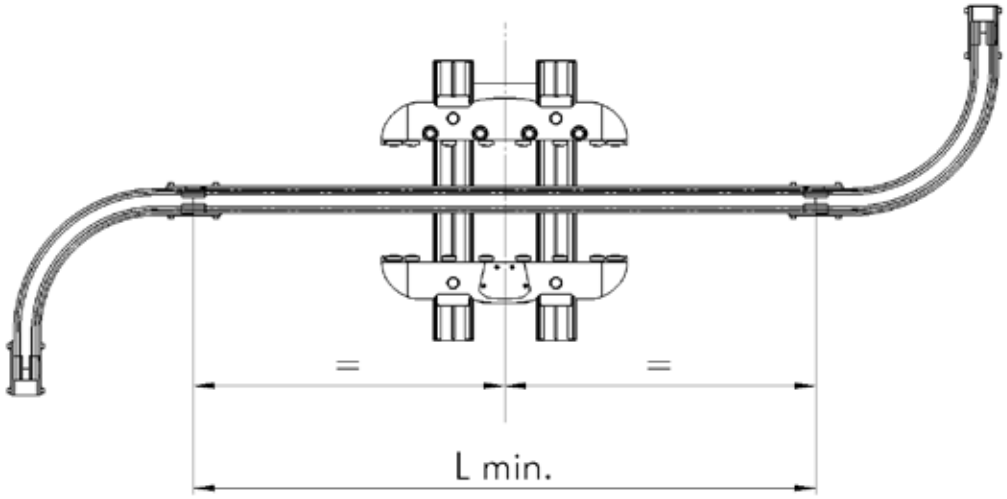
PERMITTED FORCES AND TORQUES ON THE WORKPIECE CARRIER PLATFORM IN THE POSITIONINGUNIT



Nominal pressure 5 bar (aluminum platform locked in PU-4)			Platform dimensions in mm				
			200 x 300	200 x 400	300 x 400	200 x 550	300 x 550
MX_{perm}	Positioning single	[Nm]	5	6	10.5	7	13
	Positioning multiple	[Nm]	5	6	10.5	7	13
MY_{perm}	Positioning single	[Nm]	5	9	11	13.5	18
	Positioning multiple	[Nm]	3	5	6	7	9
MZ_{perm}	Positioning single	[Nm]	15	20	20	22	22
	Positioning multiple	[Nm]	10	13	13	14	14
FX_{perm}	Positioning single	[N]	150	150	150	150	150
	Positioning multiple	[N]	150	150	150	150	150
$FY_{perm.}$	Positioning single	[N]	800	800	800	800	800
	Positioning multiple	[N]	800	800	800	800	800
FY_{perm}	Positioning single	[N]	150	150	150	150	150
	Positioning multiple	[N]	150	150	150	150	150
$FZ_{zul.}$	Positioning single	[N]	2000	3000	3000	4000	4000
	Positioning multiple	[N]	2000	3000	3000	4000	4000
FZ_{perm}	Positioning single	[N]	1000	1500	1500	2000	2000
	Positioning multiple	[N]	500	750	750	1000	1000

x_{min} = 55 mm / y_{min} = 25 mm
The specified values cause the Shuttle platform to shift max. 0.3 mm toward the force vector.
Note: If several forces act simultaneously, then the admissible forces for those special cases must be checked specifically.

POSITIONINGUNIT MINIMUM TRAC LENGTH

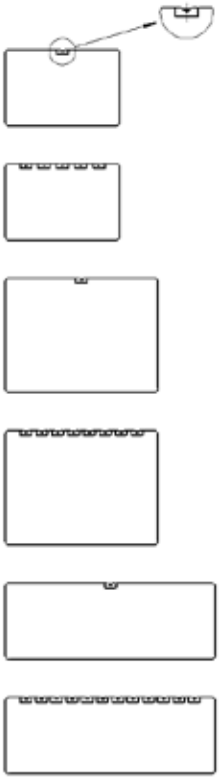


Part no.	Platform length [mm]	Positioning	$L_{min.}$ [mm]
MT65092	300	single	580

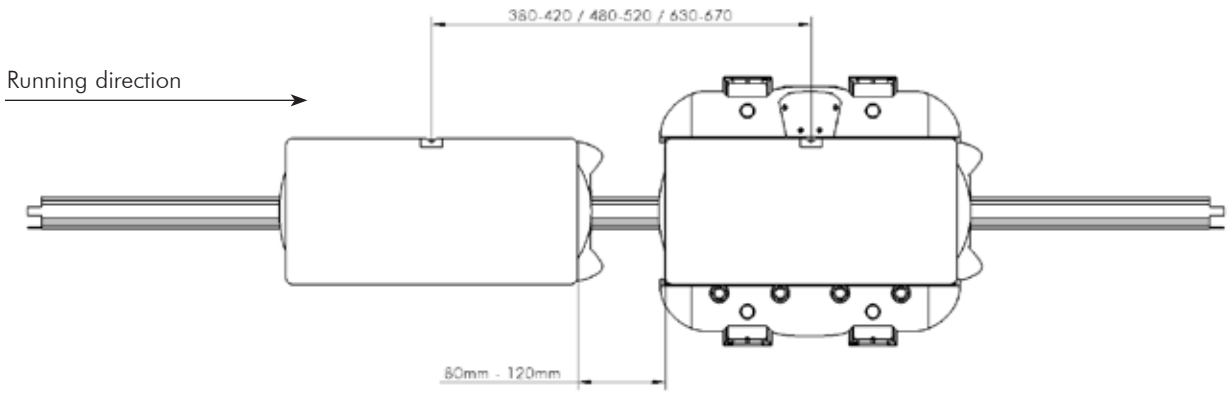
Part no.	Platform length [mm]	Positioning	$L_{min.}$ [mm]
MT65093	400	single	840
	300	multiple	840

Part no.	Platform length [mm]	Positioning	$L_{min.}$ [mm]
MT65094	550	single	1290
	400	multiple	1290

Part no.	Platform length [mm]	Positioning	$L_{min.}$ [mm]
MT65095	550	multiple	1500



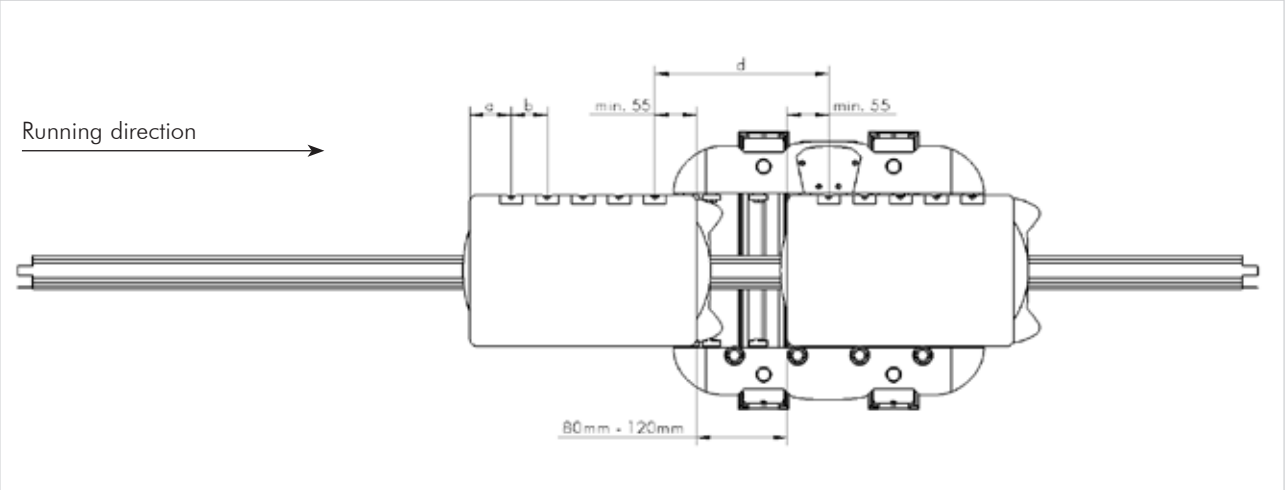
CYCLE TIMES IN SINGLE POSITIONINGUNIT SPU-4



CYCLE TIME IN SINGLE POSITIONINGUNIT SPU-4

	Cycle time Shuttle 3 with maximum load [s]	Cycle time Shuttle 3 Twin-Axle Shuttle with maximum load [s]	Cycle time Shuttle MSH-4 with maximum load [s]	Cycle time Shuttle MSH-4 Twin-Axle Shuttle with maximum load [s]
Platform L = 300 mm	2.90	–	2.80	–
Platform L = 400 mm	3.12	–	3.00	–
Platform L = 550 mm	3.34	3.55	3.20	3.20

Time measurement:
From the start command of the control element (IRM) in the PU to the presence signal of the control element (IRM) in the PU.
The rear Shuttle was positioned relative to the front Shuttle via the distance sensor (distance 100 mm).
Following configuration of the cams was used:
Entrance speed = 30 m/min (allowed only in protected area), distance AB to A-Cam = 130 mm, length A-Cam = 45 mm.
At an entrance speed of 12 m/min. the cycle time in the SPU is extended by two seconds.



CYCLE TIME FOR INCREMENT b IN MULTIPLE-POSITIONINGUNIT MPU-4.

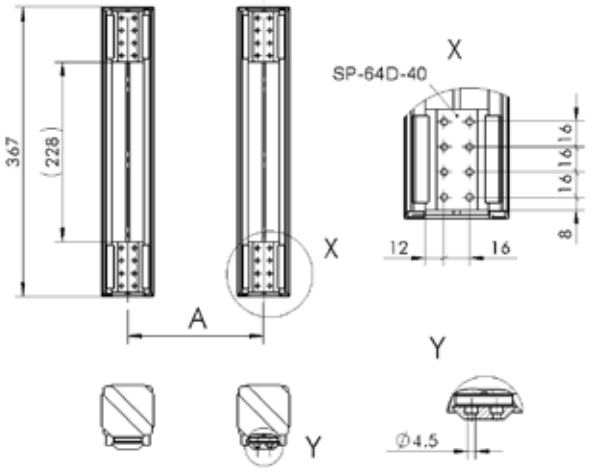
Increment b	Cycle time Shuttle 3 with maximum load [s]	Cycle time Shuttle 3 Twin-Axle Shuttle with maximum load [s]	Cycle time Shuttle MSH-4 with maximum load [s]	Cycle time Shuttle MSH-4 Twin-Axle Shuttle with maximum load [s]
40 mm	0.82	0.82	0.66	0.66
50 mm	0.86	0.87	0.76	0.76
60 mm	0.90	0.94	0.85	0.85
80 mm	1.07	1.09	1.00	1.00
100 mm	1.44	1.49	1.35	1.35
150 mm	1.48	1.52	1.40	1.40
200 mm	1.62	1.55	1.45	1.45
250 mm	1.79	1.77	1.60	1.60
300 mm	1.95	1.96	1.80	1.80

CYCLE TIME FOR INCREMENT d IN MULTIPLE POSITIONINGUNIT MPU-4.

Increment d	Cycle time Shuttle 3 with maximum load [s]	Cycle time Shuttle 3 Twin-Axle Shuttle with maximum load [s]	Cycle time Shuttle MSH-4 with maximum load [s]	Cycle time Shuttle MSH-4 Twin-Axle Shuttle with maximum load [s]
250 mm	2.40	2.60	2.40	2.40
300 mm	2.70	2.80	2.60	2.60
350 mm	2.80	2.90	2.70	2.70
400 mm	3.00	3.10	2.80	2.80
450 mm	3.10	3.20	2.90	2.90

Time measurement:
From the start command of the control element (IRM) in the PU to the presence signal of the control element (IRM) in the PU.
The rear Shuttle was positioned relative to the front Shuttle via the distance sensor (distance 100 mm).
Following configuration of the cams was used:
Entrance speed = 30 m/min (allowed only in protected area), distance AB to A-Cam = 130 mm, length A-Cam = 45 mm.

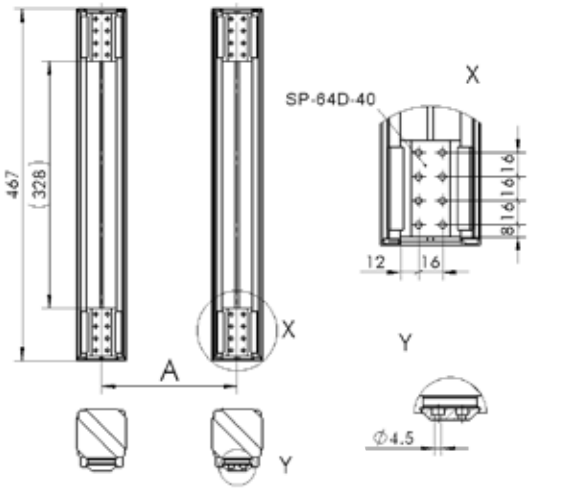
MOUNTING SET FOR POSITIONINGUNIT PU-4 (PLATFORM WIDTH 200 MM)



	Part no.
Mounting set for PU-4 (platform width 200 mm)	MT65387

Platform width 200 mm	A
MT65092	172
MT65093	172
MT65094	250
MT65095	400

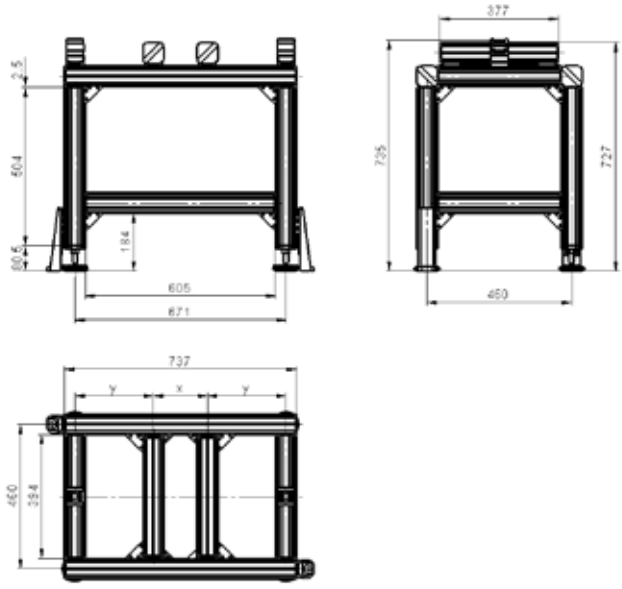
MOUNTING SET FOR POSITIONINGUNIT PU-4 (PLATFORM WIDTH 300 MM)



	Part no.
Mounting set for PU-4 (platform width 300 mm)	MT65394

Platform width 300 mm	A
MT65092	172
MT65093	172
MT65094	250
MT65095	400

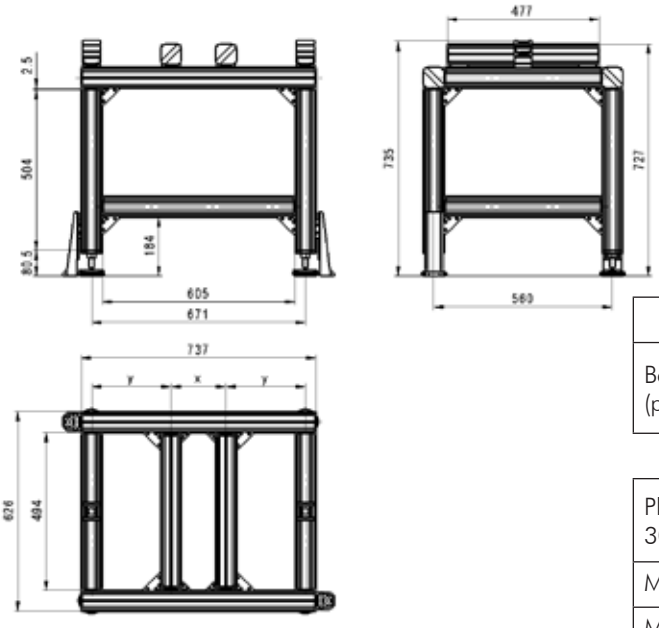
BASE FRAME FOR POSITIONINGUNIT PU-4 (PLATFORM WIDTH 200 MM)



	Part no.
Base frame for PU-4 (platform width 200 mm)	MT65395

Platform Width 200 mm	X	Y
MT65092	172	249.5
MT65093	172	249.5
MT65094	250	210.5
MT65095	400	135.5

MOUNTING SET FOR POSITIONINGUNIT PU-4 (PLATFORM WIDTH 300 MM)

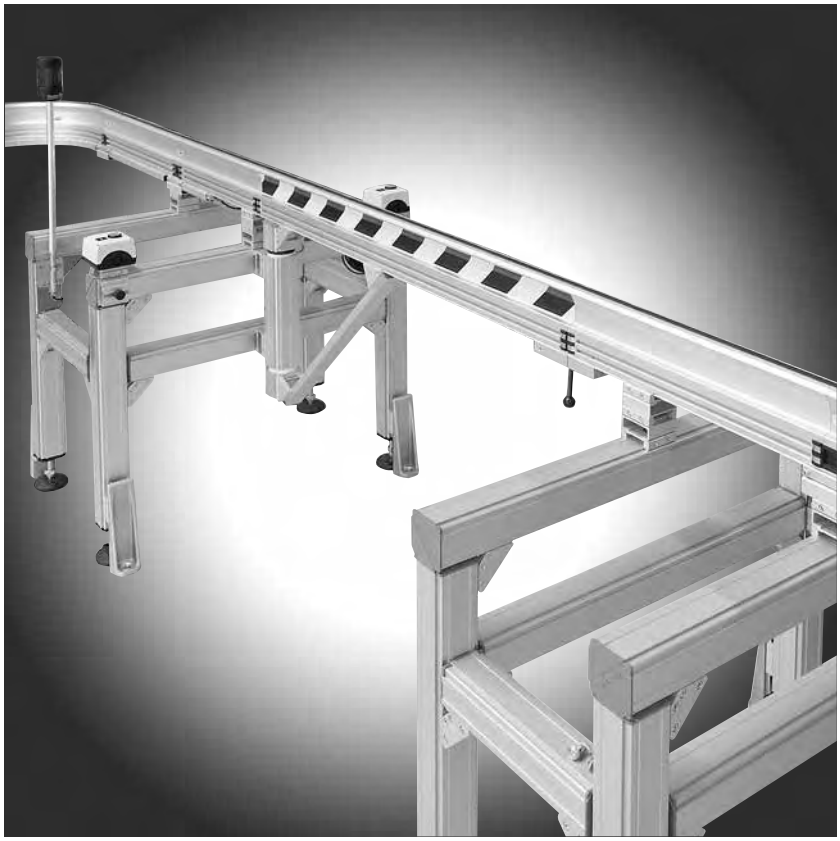


	Part no.
Base frame for PU-4 (platform width 300 mm)	MT65396

Platform Width 300 mm	X	Y
MT65092	172	249.5
MT65093	172	249.5
MT65094	250	210.5
MT65095	400	135.5

TRACDOOR

The TracDoor (door) allows passage through a Montrac line or access to manual work stations within the line. It has its own base frames, these have to be ordered separately. It is intended to permit passage for at least one person or max. a small forklift (single and double version). The principle of a TracDoor is very simple. The gate is attached to a pivot point and can be opened manually. When closing, the gate is rotated to an end stop and can be locked manually.

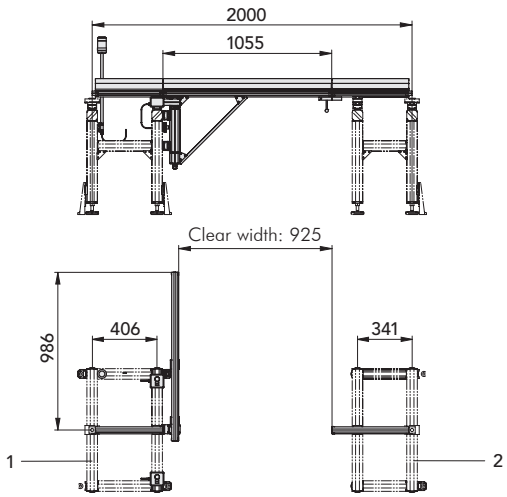


TRACDOOR SPECIFICATIONS

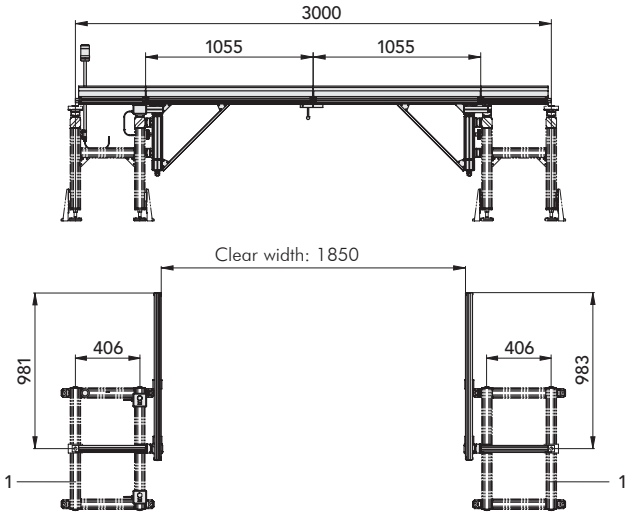
TracDoor length tolerance		[mm]	± 2.0
Material			Aluminum, nickel-plated copper, plastic
Nominal voltage		[V DC]	24
Current carrying capacity:			
– between the Trac connections		[A]	40
– on the movable Trac section		[A]	2.5
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 % – 85 % (without condensation)
	Air purity level		normal workshop ambiance

TYPE OVERVIEW OF TRACDOOR (SINGLE – DOUBLE)

The opening direction and the pivot point position can be freely selected.



The opening direction is freely selectable.

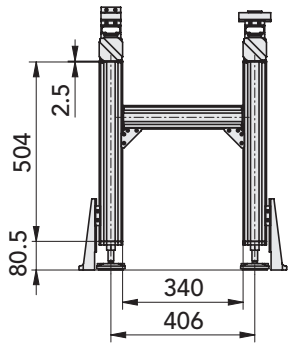


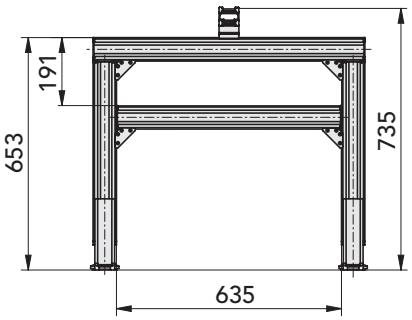
	Part no.
TracDoor single L = 2000 mm	MT56953
TracDoor single L = 3000 mm	MT56954

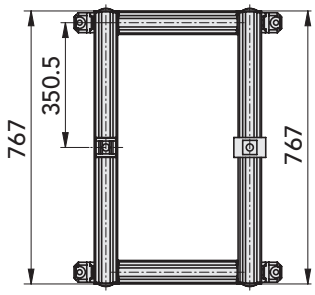
ACCESSORIES FOR TRACDOOR

	Part no.
Proximity switch M8, PNP, pluggable	MT508845
Connection cable 5 m, with straight socket on one side	MT504610
Connection cable 10 m, with straight socket on one side	MT507528
Base frame 1 for TracDoor	MT92064
Base frame 2 for TracDoor	MT92066

BASE FRAME 1 FOR TRACDOOR



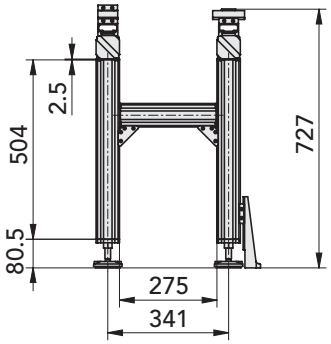


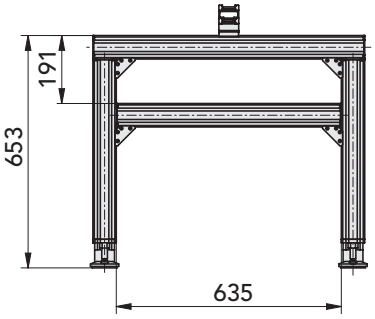


900 mm to top edge
of Shuttle platform

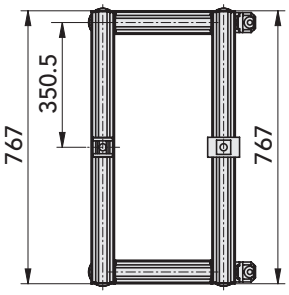
	Part no.
Base frame 1 for TracDoor (2000/3000) with FW	MT92064

BASE FRAME 2 FOR TRACDOOR





900 mm to top edge
of Shuttle platform



	Part no.
Base frame 2 for TracDoor (2000) with FW	MT92066

TRACCONTROL 1 COMPONENTS

TRACCONTROL 1 IRM

The TC1-IRM (Intelligent Routing Module) is an optoelectronic communication module for data exchange allowing Shuttle, Trac and master control to interact with each other.
The Shuttle and TC1-IRM communicate with each other via signals in the infrared spectrum.
The TC1-IRM can function as a communication interface between the rail system and the master control or as a control element operating autonomously. The communication between the master control and the IRM takes place via I/O at predefined connector pins or via the serial interface on the TC1-IRM.
TracControl 1 components are not compatible with TracControl 2 components as a different transmission protocol is used for the TracControl 2.

TRACCONTROL 1 IRM SPECIFICATIONS

Power supply		[V DC]	24
Power consumption		[mA]	25 (with 24 V DC)
Max. load current		[A]	1 (with 24 V DC), outputs short-circuit proof
Connections			2 identically configured 10-pin JST connectors 1 x RS232 3 x DIN 3 x DOT
Dimensions		[mm]	102 x 36 x 11 (length x width x height)
Net weight		[g]	33
Ambiance:	Temperature Rel. air humidity Air purity level	[°C]	10 to 40 5 % – 85 % (without condensation) normal workshop ambiance
Minimum requirement / compatibility			Shuttle 3, Shuttle MSH-4

INTERFACES

The electric plug connections on the TC1-IRM are divided into three sections:

- Power supply 24 V DC
- Digital inputs/outputs which can be allocated to a specific function via a configuration (e.g. Shuttle Start, Shuttle Detect, Shuttle Lock, log-off, etc.); for conventional operation with external control and/or for TC1-IRM logic function incl. chaos technology.
- Serial interface RS232, communication interface for reading and writing the Shuttle identification number (group or ID), for Shuttle control in networked systems, status indication, visualization, etc.

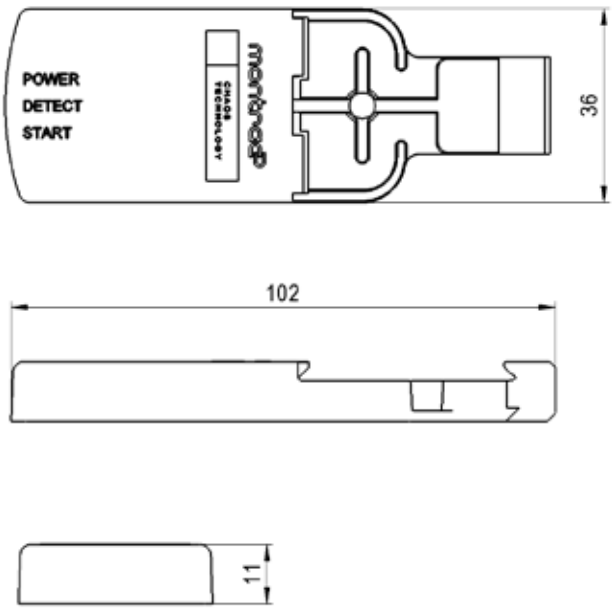
MONTRAC TC1-IRM CONFIGURATION

The "Montrac TC1-IRM / ISM configurator" configures the desired TC1-IRM type and the corresponding parameters. There are 14 module types available from a drop-down menu as a standard version. The range of functions includes everything from curve monitoring to autonomous actuation of TracSwitches. The locking of the Shuttle, e.g. at a manual working station, can be controlled via the TC1-IRM as well. This software can also be used to read and re-write Shuttle identification numbers. The latest version is available under www.montratec.com

ACCESSORIES, CONNECTION BOXES AND CABLES

An TC1-IRM is needed at each stopping point in the system to detect a present Shuttle and to start the Shuttles. The "TC1-IRM Basic" assembly serves this purpose. It consists of a TC1-IRM, a connection cable, an AB-cam (speed reduction), and an A-cam (stop). Various connection kits are available for specific uses: connection box (terminal box) for a single TC1-IRM, with or without proximity switch holder; connection box for two TC1-IRMs with one proximity switch holder; and connection box for one TC1-IRM with two proximity switch holders. When using the Montrac Configurator, the TC1-IRMs and the respective kits can be assigned automatically. Thus at the push of a button a correct material list can be generated.

TRACCONTROL 1 IRM DIMENSIONS



TC1-IRM Intelligent Routing Module	Part no.
TC1-IRM Basic (with Y cable, AB- and A-Cam)	MT56936
TC1-Basic Kit (TC1-IRM) Box Single, supply cable	MT56937
TC1-Curve Kit (TC1-IRM) holder for signal generator, Box single, supply cable	MT56938
TC1-Double Module Kit (TC1-IRM) holder for signal generator, Box double, supply cable	MT56939
TC1-Double Sensor Kit (TC1-IRM) 2 x holder for signal generator, Box double, supply cable	MT56940

TRACCONTROL ACCESSORIES

	Part no.
Proximity switch M4, PNP, with cable and connector S8	MT520292
Proximity switch M8, PnP, pluggable	MT508845
Proximity switch holder	MT45428
A-Cam straight	MT47200
A-Cam complete L = 21 ... 44 mm	MT90730/21..44
B-Cam	MT45314
AB-Cam	MT45315
A- and AB-Cam Set	MT90759
Flag AB and A-Cam	MT57020
Flag for AB-cam	MT58183
Flag for B-cam	MT58184
Flag A-Cam for PU-4 "CW"	MT57008
Flag A-Cam for PU-4 "CCW"	MT57442
Electrically switchable cam "off" (power-off for Shuttle visible)	MT57023
Electrically switchable cam "on" (power-off for Shuttle invisible)	MT57024
Assembling gauge for IRM	MT92008
ShuttleLock	MT56925

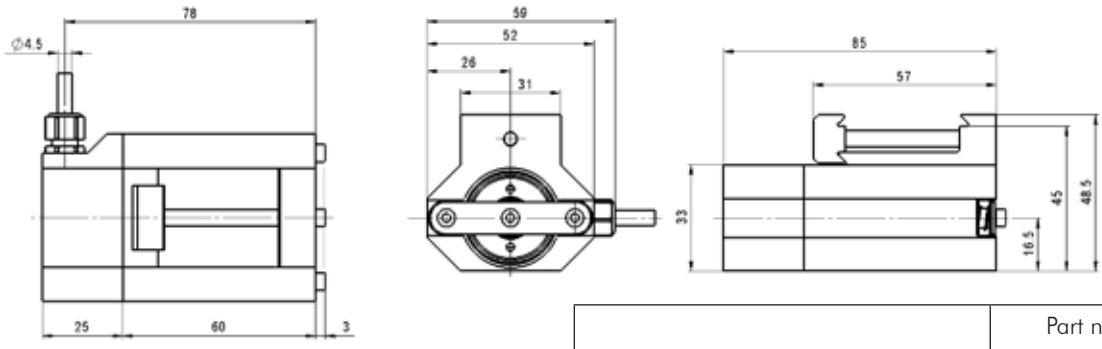
ACCESSORIES FOR TRACCONTROL 1 IRM

	Part no.
TC1-IRM cabling L=1500 mm	MT56986
Cable for TC1-IRM Box supply	MT57184
PC connection cable	MT57579
Connection cable 5 m, with straight socket on one side	MT504610
Connection cable 5 m, with angled socket on one side	MT504929
Connection cable 10 m, with straight socket on one side	MT507528
Connection cable 10 m, with angled socket on one side	MT507529
TC1-IRM configuration by montratec	MT56944
TC1-IRM Configurator Unit	MT58693
Box Single	MT56984
Box Double	MT56985

The TC1-IRM can be configured using the box and the PC interconnection cable MT57579
For current version of the software TC1-IRM/ISM Configurator please refer to www.schmid-group.com.

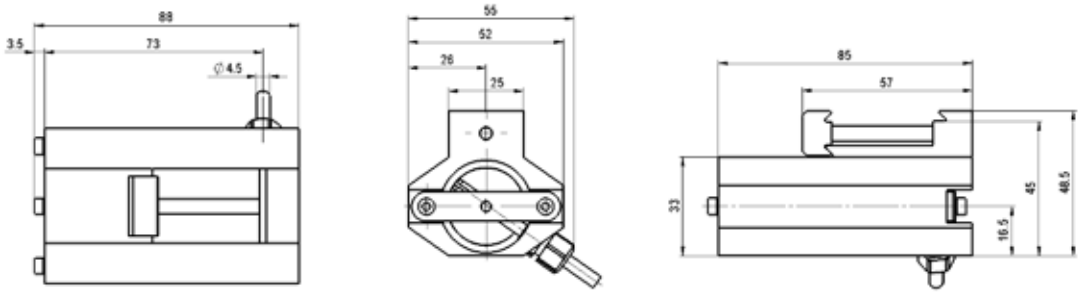
ACCESSORIES FOR TRACCONTROL: ELECTRICALLY SWITCHABLE CAM

The electrically switchable cam is used in the following cases: when a Shuttle is to be started backwards or if not every Shuttle is to stop at a defined position.



	Part no.
Electrically switchable cam "off" (power-off for Shuttle visible)	MT57023

The electrically switchable cam is used in the following cases: when a Shuttle is to be started backwards or if not every Shuttle is to stop at a defined position.

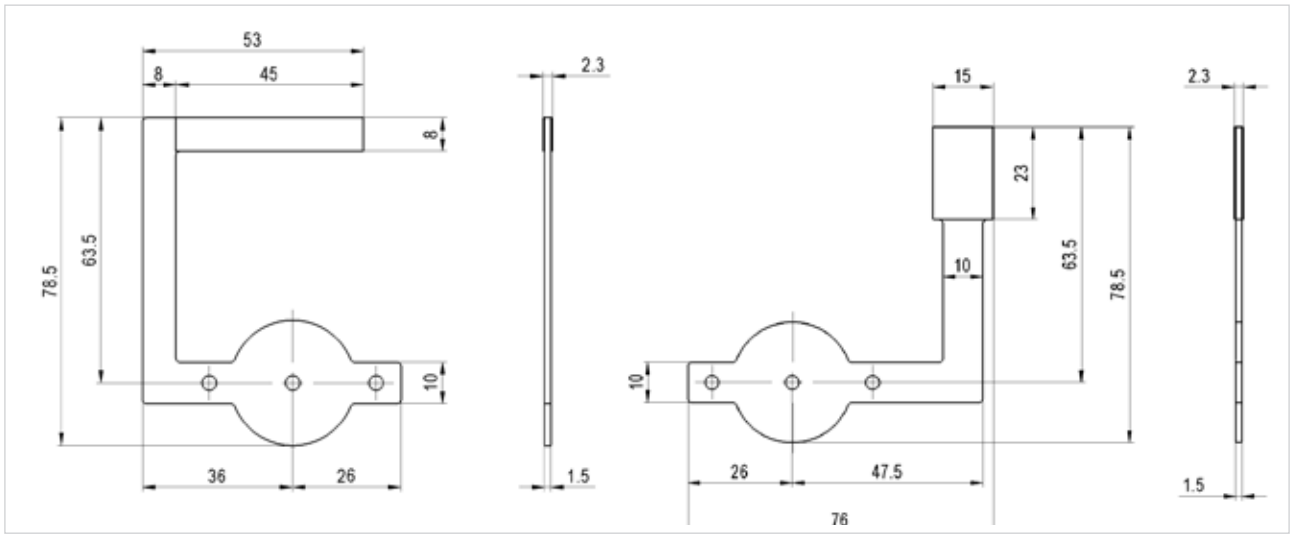


	Part no.
Electrically switchable cam "on" (power-off for Shuttle invisible)	MT57024

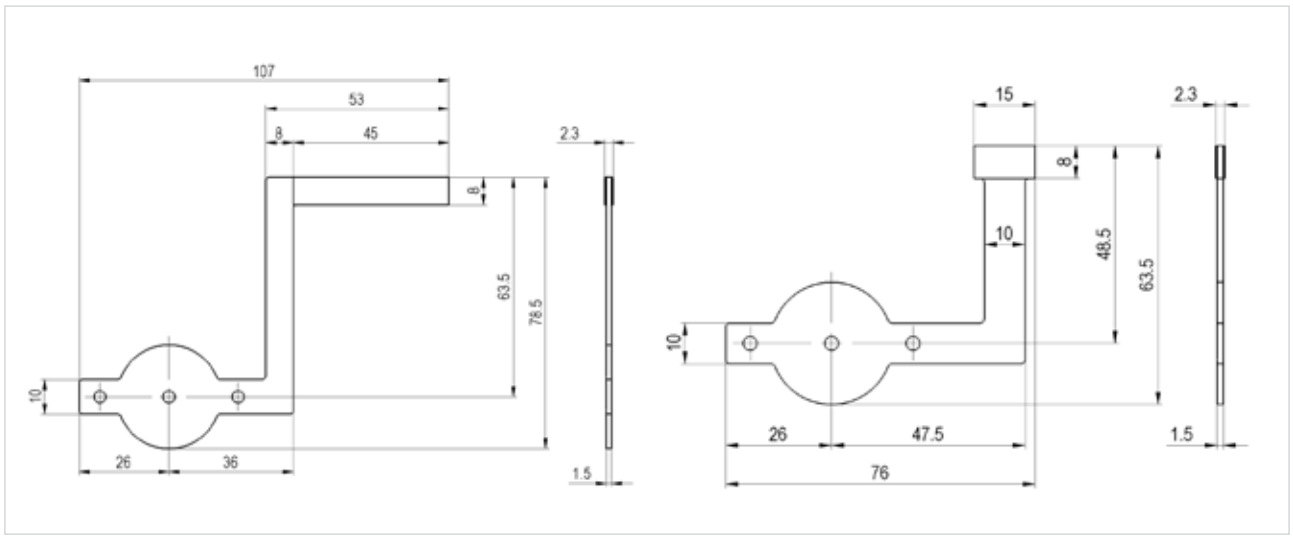
ELECTRICALLY SWITCHABLE CAMS SPECIFICATIONS

Net weight		[kg]	0.5
Connection voltage		[V DC]	24
Current consumption		[A]	0.5
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 %- 85 % (without condensation)
	Air purity level		normal workshop ambiance

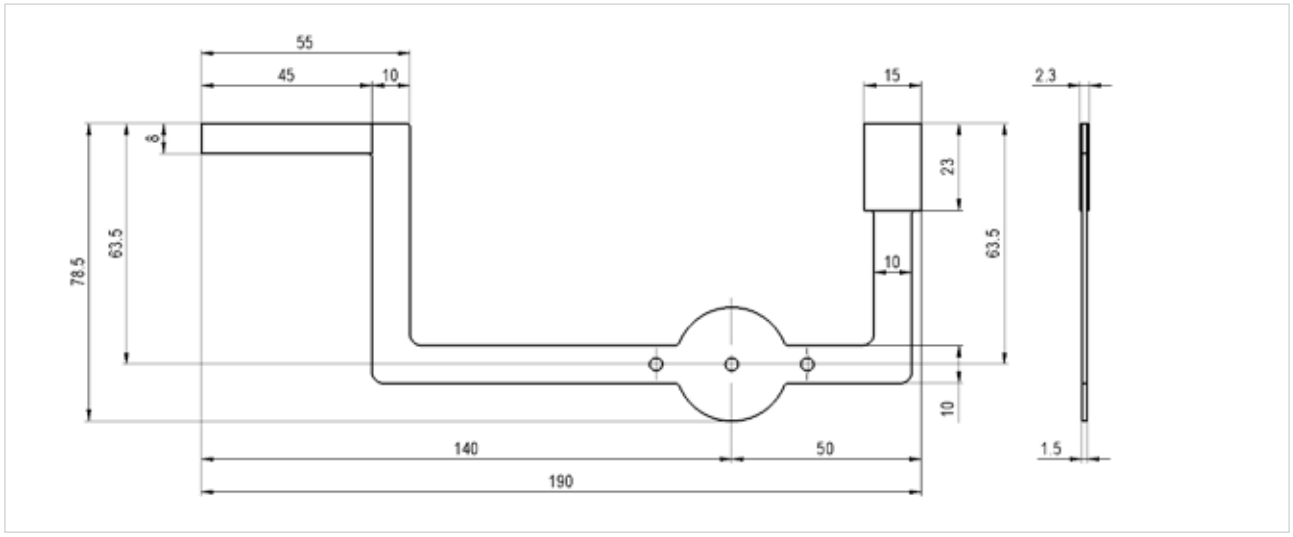
FLAG A-CAM FOR PU-4 CW (MT57008) FLAG AB-CAM (MT58183)



FLAG A-CAM FOR PU-4 CCW (MT57442) FLAG B CAM (MT58184)

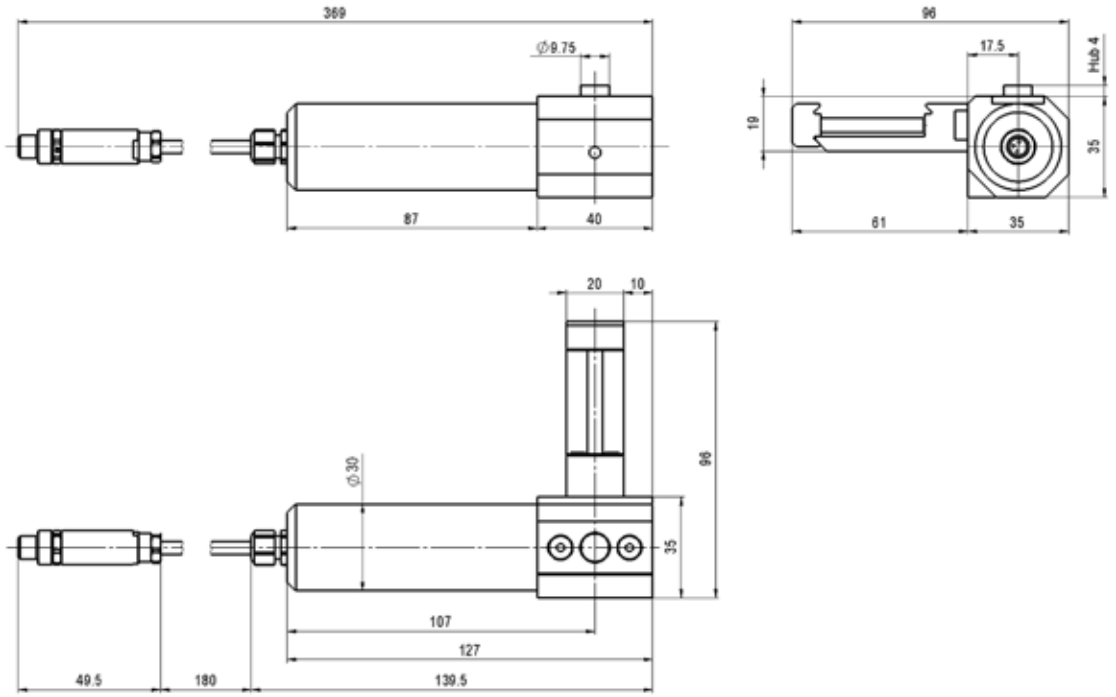


FLAG A-CAM AND AB-CAM (MT57020)



ACCESSORIES FOR TRACCONTROL: SHUTTLELOCK MT56925 (DIM. DRAWING)

The ShuttleLock serves to localize a Shuttle at a hand-work place or on the lift.



SHUTTLELOCK SPECIFICATIONS

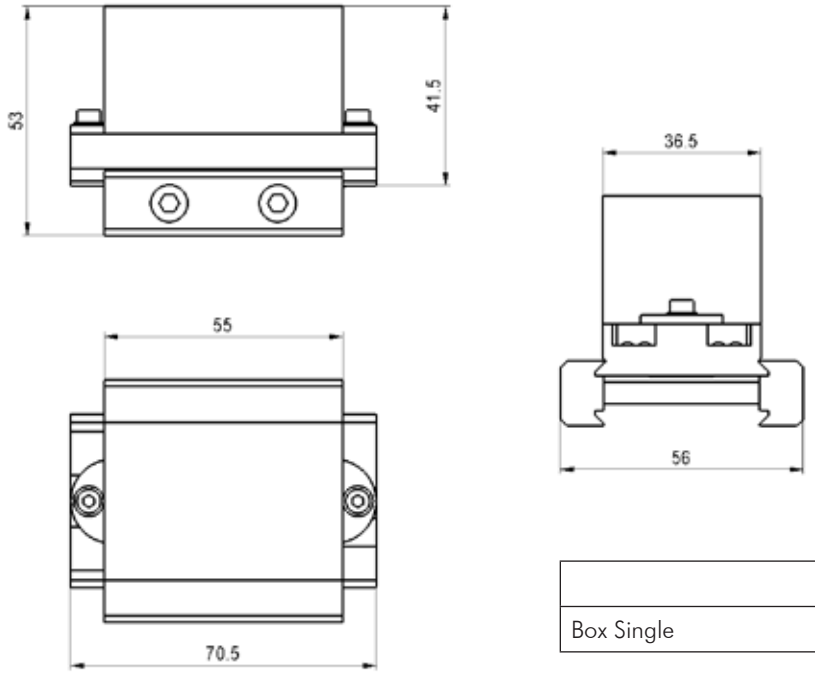
Net weight		[kg]	0.560
Connection voltage		[V DC]	24
Current consumption		[A]	0.5
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 %- 85 % (without condensation)
	Air purity level		normal workshop ambiance

ACCESSORIES FOR SHUTTLELOCK

	Part no.
Proximity switch M4, PNP, with cable and connector S8 (for ShuttleLock)	MT520292

ACCESSORIES FOR TRACCONTROL 1 IRM: BOX SINGLE (DIMENSION DRAWING)

The Box single is used for wiring a Montrac system.
The Box Single is the interface between the TC1-IRM and their peripherals, or master control. Since all the inputs and outputs of the TC1-IRM can be picked up in the box, it is universally usable.



	Part no.
Box Single	MT56984

TRACCONTROL 1 IRM ACCESSORIES SPECIFICATIONS: BOX SINGLE MT56984

Net weight		[g]	160
Max. cable cross-section		[mm²]	0.5
Max. cable diameter		[mm]	5
Max. voltage		[V DC]	24
Max. current		[A]	2
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 %- 85 % (without condensation)
	Air purity level		normal workshop ambiance

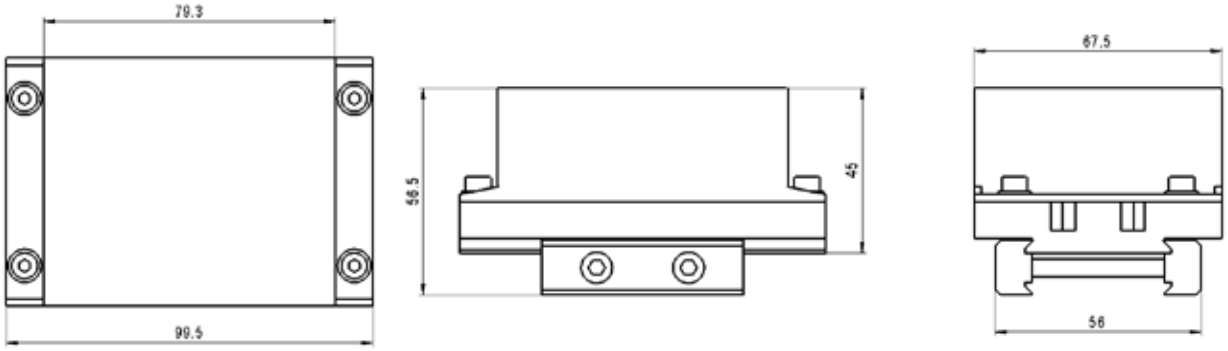
ACCESSORIES FOR BOX SINGLE MT56984

	Part no.
Cable for TC1-IRM Box supply	MT57184
PC connection cable	MT57579

With the PC interconnection cable MT57579 and by means of a Shuttle, the TC1-IRM can be configured using the box.
The latest version of the TC1-IRM/ISM software can be downloaded from the website www.schmid-group.com.

ACCESSORIES FOR TRACCONTROL 1 IRM: BOX DOUBLE (DIMENSION DRAWING)

The Box double is used for wiring a Montrac system. The Box double is the interface between one or two TC1-IRMs and their peripherals, or master control. Since all the inputs and outputs of the TC1-IRM can be picked up in the box, it is universally usable.



	Part no.
Box Double	MT56985

TRACCONTROL 1 IRM ACCESSORIES SPECIFICATIONS: BOX DOUBLE MT56985

Net weight		[g]	320
Max. cable cross-section		[mm²]	0.5
Max. cable diameter		[mm]	7
Max. voltage		[V DC]	24
Max. current		[A]	2
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 %- 85 % (without condensation)
	Air purity level		normal workshop ambiance

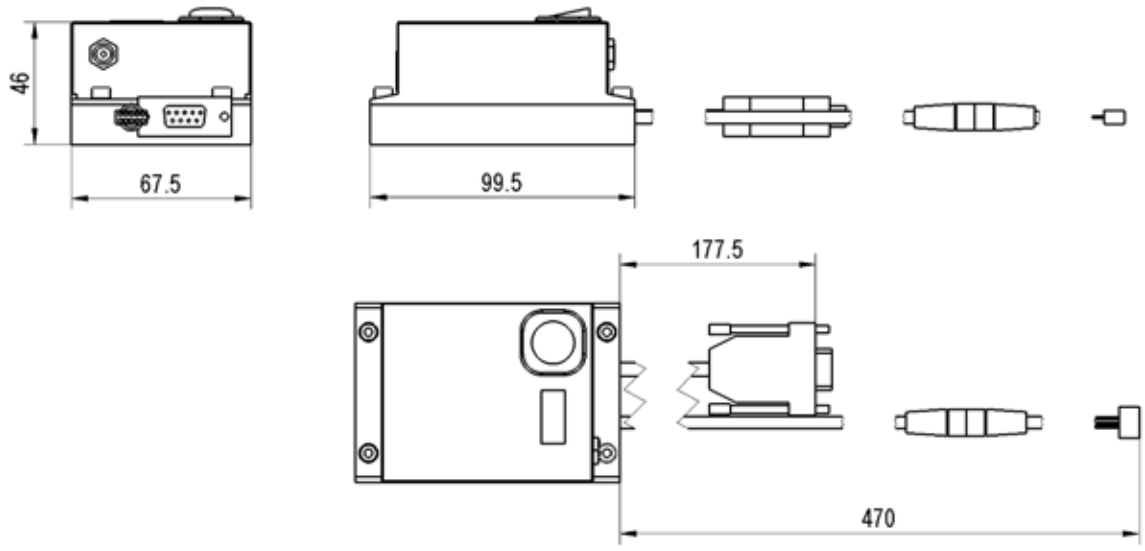
ACCESSORIES FOR BOX DOUBLE MT56985

	Part no.
Cable for TC1-IRM Box supply	MT57184
PC connection cable	MT57579

With the PC interconnection cable MT57579 and by means of a Shuttle, the TC1-IRM can be configured using the box.
The latest version of the TC1-IRM/ISM software can be downloaded from the website www.schmid-group.com.

ACCESSORIES FOR TRACCONTROL 1 IRM: CONFIGURATOR UNIT MT56944 (DIMENSION DRAWING)

The TC1-IRM configuration unit serves to configure the TC1-IRM (Intelligent Routing Modules). With the aid of software (TC1-IRM/TC1-ISM Configurator) the desired functions can be assigned to an TC1-IRM and the necessary parameters can be configured. Further, the TC1-ISM (Intelligent Shuttle Module) in the Shuttle can be assigned a new Shuttle number.

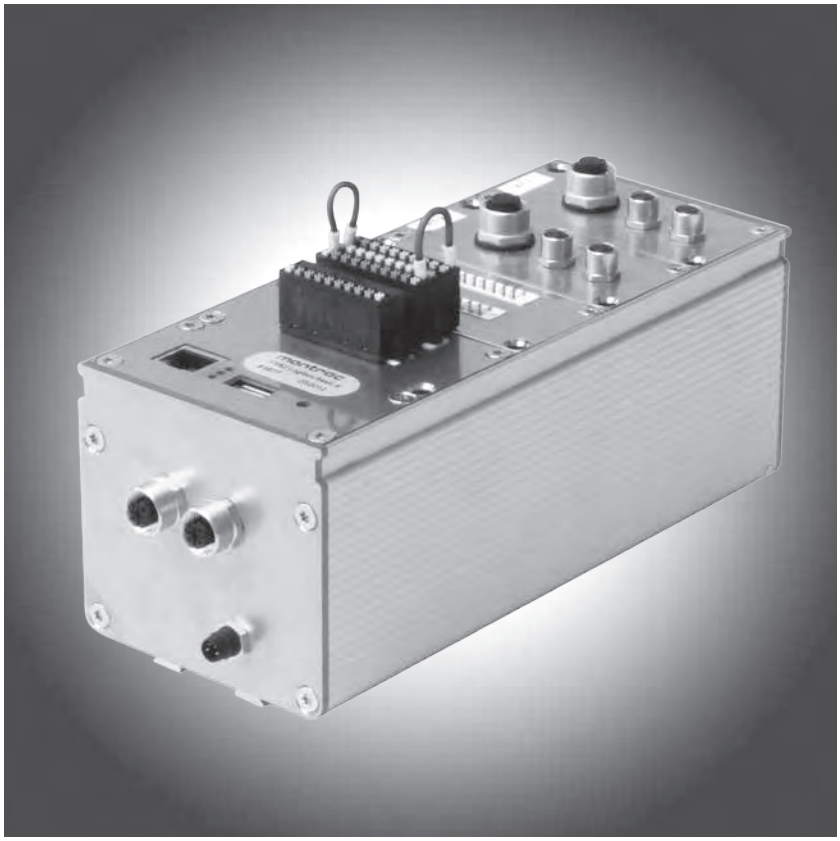


TRACCONTROL 1 IRM ACCESSORIES SPECIFICATIONS: CONFIGURATOR UNIT

Net weight		[kg]	0.5
Material			Aluminum, copper, steel, plastic
Connection voltage		[V AC]	90–284
Frequency		[Hz]	47–63
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 %- 85 % (without condensation)
	Air purity level		normal workshop ambiance

TRACCONTROL 2 COMPONENTS

TracControl 2 offers many ways of controlling a Montrac system. Here modules comprising individual standardized Montrac components are controlled by a Montrac TracControl 2 Unit (TC2U).



TRACCONTROL 2 UNIT (TC2U)

The TC2U is the central control unit of the Montrac system, when this is controlled by TracControl 2. Standardized modules, consisting of individual Montrac components such as TracSwitch, TC2-IRM-CAN and sensors are connected to it with the CAN bus or digital inputs/outputs. The TC2U is available with a varying number of board slots in order to insert switch boards or digital I/O boards. The TC2U provides for instance an Ethernet hardware interface to communicate with other controls or host computers. For this purpose the UDP based MDAC protocol (Montrac-specific protocol) is used. The interface allows a guide system to control and monitor the Montrac system.
The TCU can communicate with external control elements using I/O signals, in the same way as the TracControl 1.

CONFIGURATION TC2U

The WebGUI available on the TC2U with which all modules and the TC2U are configured can be easily called up using any web browser. A Secure-Shell Connection (SSH) is available to access the TC2U in order to undertake customer-specific settings, read out log files or carry out a software update. As the TC2U can be integrated in a network, remote maintenance is easily realized.

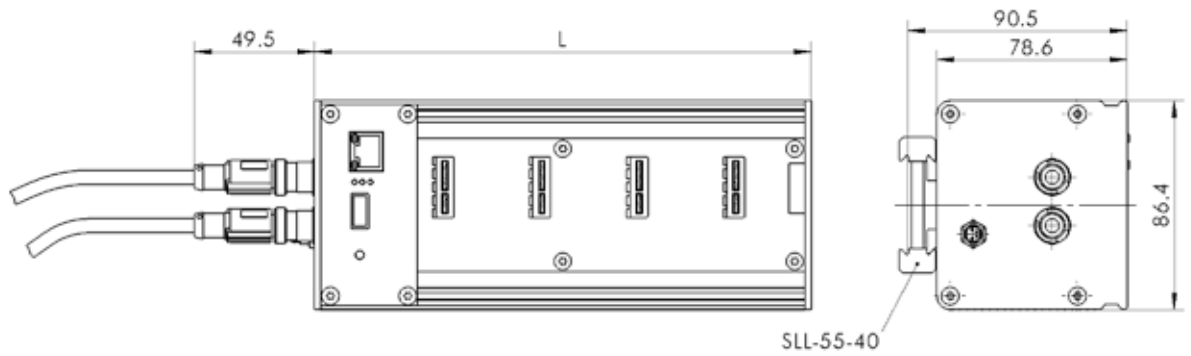
DATA LOGGING

The embedded Linux operating system on the TC2U contains BusyBox and thus syslog.
With this, log messages from all modules and the TC2U are transferred through the Ethernet interface and can be collected by a syslog server. The TracControl 2 is very easy and fast to wire thanks to plug-in connections.

TRACCONTROL 2 UNIT (TC2U) SPECIFICATIONS

Number of connection slots			2	4	6	8	10
Net weight without plug-in boards		[kg]	0.7	0.9	1.1	1.3	1.5
Length		[mm]	125	205	285	365	445
Input voltage		[V DC]	24				
Current consumption (at 24 V DC)		[mA]	≤ 200 (without plug-in boards)				
Min. input voltage inputs		[V DC]	22.4				
Max. input voltage inputs		[V DC]	27.9				
Current consumption per input		[mA]	3				
Output voltage outputs		[V DC]	Input voltage				
Max. output current per digital output		[mA]	500				
Max. output current per I/O board		[mA]	3500				
Max. output current per TC2U		[mA]	6000				
Material			Aluminum, copper, steel, brass, plastic				
Type of protection			IP 20				
Ambiance:	Temperature	[°C]	10 to 40				
	Rel. air humidity		5 %- 85 % (without condensation)				
	Air purity level		normal workshop ambiance				

TRACCONTROL 2 UNIT DIMENSIONS

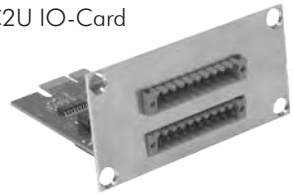


TC2U	Length L [mm]	Part no.
MX-TC2U-2SLOT	125	MT60533
MX-TC2U-4SLOT	205	MT61577
MX-TC2U-6SLOT	285	MT61694
MX-TC2U-8SLOT	365	MT61695
MX-TC2U-10SLOT	445	MT61992

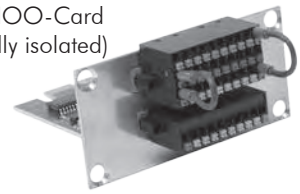
TRACCONTROL 2 ACCESSORIES: PLUG-IN BOARDS FOR TRACCONTROL 2 UNIT (TC2U)

MX-TC2U TS-Card

MX-TC2U IO-Card



MX-TC2U IOO-Card
(galvanically isolated)

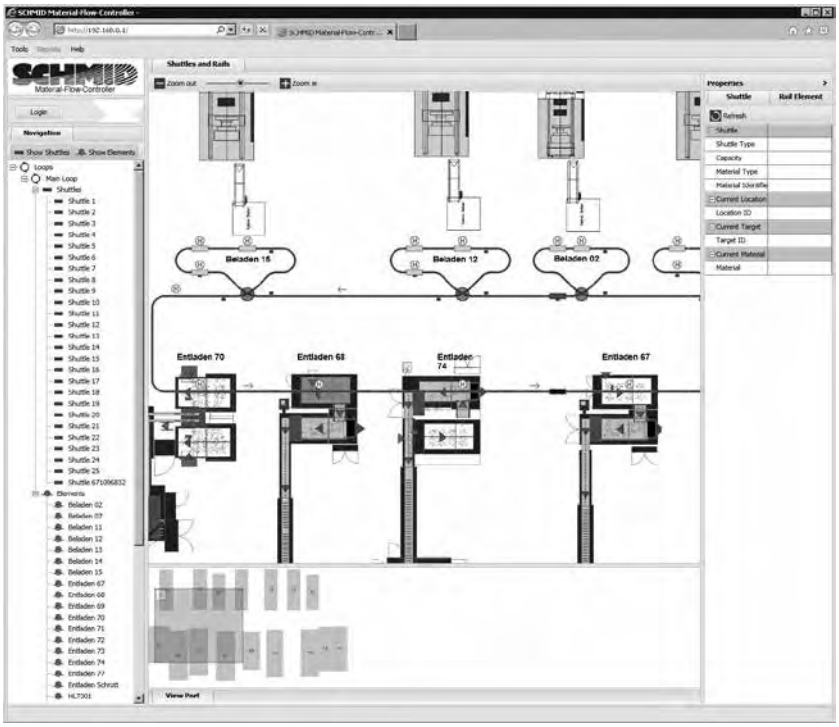


Plug-in board for TC2U	MX-TC2U TS-Card	MX-TC2U IO-Card	MX-TC2U IOO-Card
Part no.	MT61574	MT61575	MT61576
Net weight [g]	69	46	97
Connections	1 x M12 for TracSwitch 2 x M8 for log-off sensor	8 x DIN 8 x DOUT	8 x DIN galvanically isolated 8 x DOUT galvanically solated

TC2U ACCESSORIES

	Part no.
Power supply cable M8, 4-pin, 2 m	MT521155
Blank cover TC2U (net weight 40 g)	MT61578
Cover for socket connector 3.5 mm	MT521149
Socket connector 3.5 mm 30 p. PUSHIN PNP LED	EX-000003065-000
Socket connector 3.5 mm 10 p. PUSHIN PNP LED	EX-000003066-000
Socket connector 3.5 mm 30 p. screw-in	EX-000003068-000
Code element for socket connector	EX-000003067-000
Connection resistor CAN	MT521129
SMD fuse 2 A	EF-000000783-000
SMD fuse 4 A	EF-000000782-000
SMD fuse 6.3 A	EF-000000447-000

TRACCONTROL 2 MFC

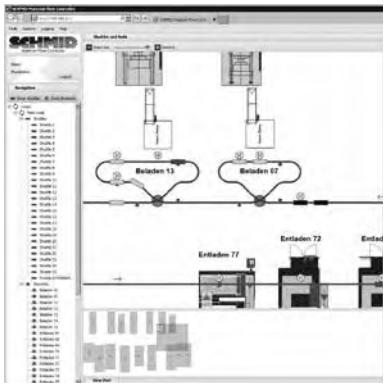


The TracControl 2 Material Flow Controller (TC2-MFC) is used to visualize, control and record the material flow of a Montrac system in detail and to monitor the system status. Communication with host systems and external components is additionally possible through standard interfaces. The TC2-MFC guarantees intelligent monitoring and utilization of the Montrac system. The positions of the shuttles and their destinations can be seen at any time by the material flow control.
In connection with the intelligent TracControl 2 controller, all transport movements can be controlled and blockades and traffic jams avoided to achieve optimum utilization. The user-friendly MFC-GUI (graphical user interface) can be displayed from any network PC with any standard browser. Remote access facilities such as VPN are thus possible irrespective of your current location.
Thanks to integrated script processing, the TC2-MFC can be efficiently adapted to the specifications of any project.

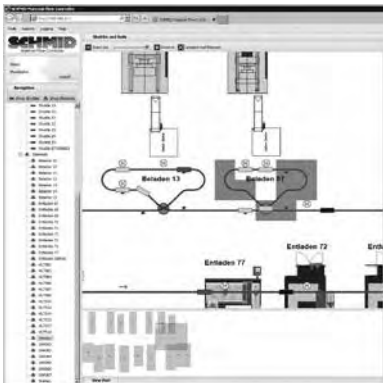
INTERFACES OF THE TC2-MFC

TCP/IP	Interface to the GUI of the TC2-MFC
SECS/GEM	Interface for connection to the Host Manufacturing Execution System /(MES) with the SECS/GEM protocol.
OPC	Interface for communication with external control elements such as robots, handling systems etc. through the OPC protocol.
MDAC	Interface for communication with TC2U, based on UDP

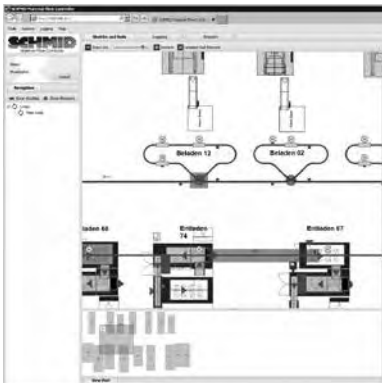
DISPLAY AND OPERATING FUNCTIONS OF THE TC2-MFCs



The positions and travel destinations of the individual Shuttles are displayed.
Advantages: visualization and clearly laid out display of the material flow of the whole system.



The statuses of the Montrac components such as TracSwitch, lifts etc. are displayed and can be changed.
Advantage: system status is intuitively apparent.



Error messages are displayed and can be reset.
Advantage: enables remote diagnostics and -support.

Various system-specific data are displayed and logged.
Advantages:

- Material tracking
- Error reproduction
- Shuttle, material and status report

TC2-MFC ACCESSORIES

	Part no.
PC 19", industrial PC, acc. to Spec / Win / RAID1	EA-000001666-000
USV, Back-ups CS650 USB: BK650EI	EG-000000112-000
Angle bracket/V2A/computer fixture/CPU-SWIT/RE	16,012.0169.0001
17" touch-screen monitor serial/USB	EA-000001014-000
PC extender, Lindy junior set	EA-000000808-000
3-in-1 KVM cable PS/2+VGA St/St 2m	EA-000000840-000
SUB-D-extension Bu/St, 9-pin 1.8 m	EX-000001101-000
Holder / AlMg3/0100X0150X2	16,012.0232.0000

TRACCONTROL 2 CONTROL COMPONENTS

TRACCONTROL 2 IRM (TC2-IRM)

The TracControl 2 IRM (TC2-IRM) is an opto-electronic communication module for data exchange between the Shuttle and the controller, allowing them to interact. When the Shuttle is equipped with TracControl 2, it includes a 4096-byte FRAM which can be written with any data. The TC2-IRM can function as a communication interface between the rail system and the TC2U or as an autonomously functioning control element such as a curve monitor. The communication between TC2-IRM and the TC2U is performed using a CAN bus. TracControl 2 components are not compatible with TracControl 1 components, as a different infrared transmission protocol is used for the TracControl 2.

TRACCONTROL 2 IRM SPECIFICATIONS

Net weight		[g]	46
Power supply		[V DC]	24
Current consumption (at 24 V DC)		[mA]	40
Max. load current (at 24 V DC)		[A]	1, outputs short-circuit proof
Connections			2 identically configured 8-pin JST connectors 3 x DIN 3 x DOT 1 x +24 V 1 x GND 1 8-pin JST connector 2 x CAN 2 x +24 V 2 x GND
Dimensions (L x W x H)		[mm]	102 x 36 x 11
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 %- 85 % (without condensation)
	Air purity level		normal workshop ambiance

TracControl 2 IRM	Part no.
MX-TC2-IRM-BASIC (with cable detect start, A- und AB-Cam)	MT61613
MX-TC2-IRM-CAN (with cable CAN, Y distributor, A- and AB-Cam)	MT61614
MX-TC2-IRM-CURVE (with cable to sensor, A- and AB-Cam)	MT61615

TRACCONTROL 2 WIRING

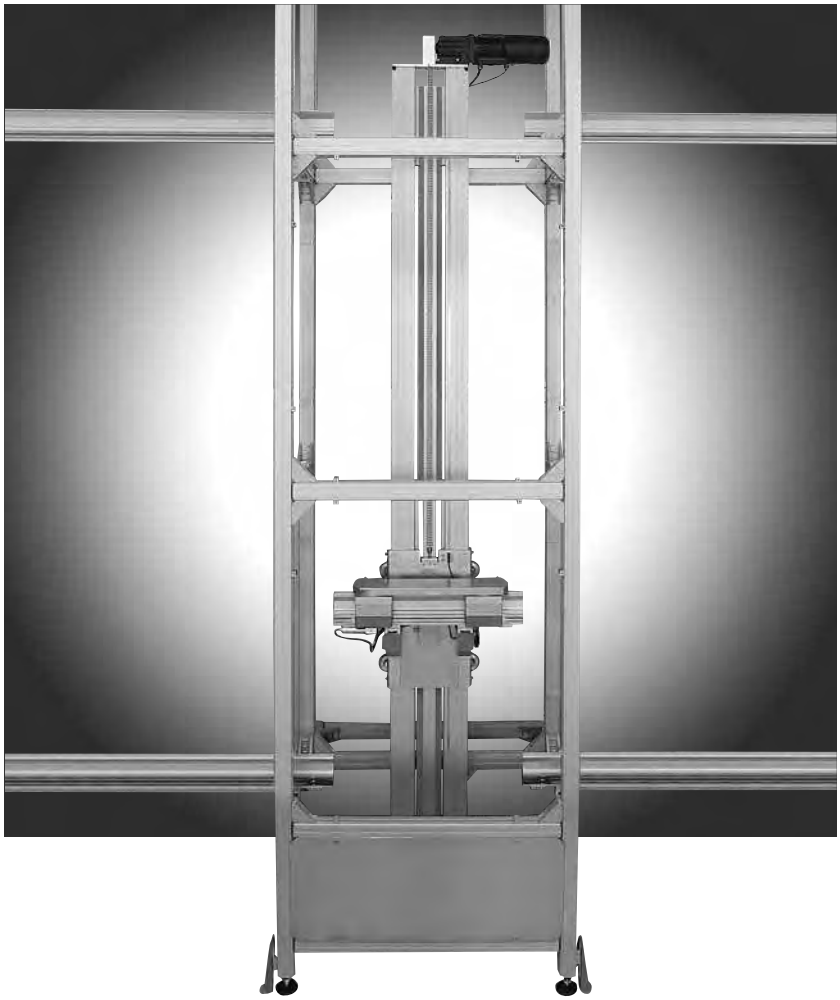
	Part no.
TracSwitch cable M12, 8-pin, 1.5 m	MT521121
TracSwitch cable M12, 8-pin, 3 m	MT521122
TracSwitch cable M12, 8-pin, 5 m	MT521123
TracSwitch cable M12, 8-pin, 10 m	MT521124
Sensor cable M8, 3-pin, 1.5 m	MT521117
Sensor cable M8, 3-pin, 3 m	MT521118
Sensor cable M8, 3-pin, 5 m	MT521119
Sensor cable M8, 3-pin, 10 m	MT521120
CAN cable M12, 1 m	MT521125
CAN cable M12, 2 m	MT521126
CAN cable M12, 5 m	MT521127
CAN cable M12, 10 m	MT521128
Detect-Start cable TC2-IRM	MT61470
TC2-IRM supply cable	MT61446
Cable to TC2-IRM sensor	MT61444
Cable CAN TC2-IRM	MT65262
Cable to TC2-IRM consumer	MT61612
Y-Vert. 5-pin M12 ST. to 2 x M12 socket	EX-000010484-000

LIFT

The lift allows the vertical transport of the Shuttles. Use the following tasks as examples:

– Connecting two or more systems of different work heights
– Taking Shuttles from a station to a ceiling system or vice versa

Protection of employees in the lift area is imperative.



LIFT SPECIFICATIONS

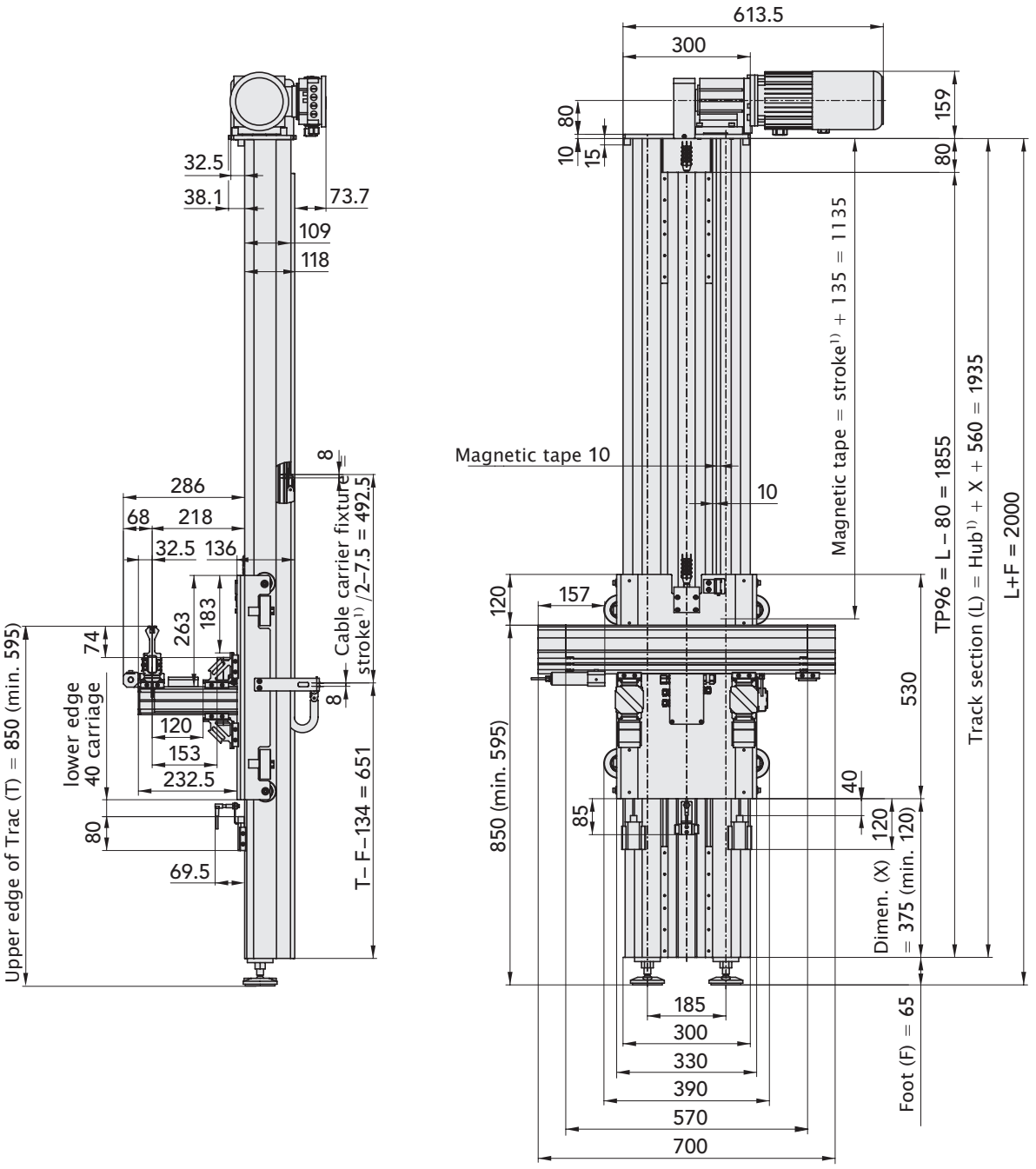
Net weight	basic construction	[kg]	75
	per additional meter	[kg]	14
Min. clearance between the Trac and the floor		[mm]	595
Max. stroke		[mm]	5330
Max. additional load		[kg]	34
Max. speed		[m/s]	1.5
Max. acceleration with 17 kg load		[m/s^2]	5
Max. acceleration with 34 kg load		[m/s^2]	2.5
Max. positions			7
Drive			Gear motor
Nom. motor capacity		[W]	550
Type of protection			IP 54
Encoder system			Resolver
Feedback system			External measuring system
Reference point initiator			External inductive proximity switch PNP
Sound pressure level		[dBA]	< 66
Operating temperature of motor		[°C]	65

CYCLE TIMES OF SHUTTLE IN LIFT

Cycle times [s]	platform length	Forwards in, forwards out [s]	Forwards in, backwards out [s]
Shuttle	300 mm	4.5	6.3
Shuttle	400 mm	4.8	6.3
Shuttle	550 mm	5.0	6.3
Twin-Axle Shuttle (rear axle empty)	550 mm	5.0	6.3
Twin-Axle-Shuttle	550 mm	5.3	6.5
Travel time of lift with up to17 kg load	stroke ≤ 0.45 m	➡ $\sqrt{\frac{\text{Stroke in m}}{5}} \cdot 2$ = travel time [s]	
Travel time of lift with up to17 kg load	stroke > 0.45 m	➡ $\frac{\text{Stroke in m } -0.45}{1.5} + 0.6$ = travel time [s]	
Travel time of lift with up to 34 kg load	stroke ≤ 0.9 m	➡ $\sqrt{\frac{\text{Stroke in m}}{2.5}} \cdot 2$ = travel time [s]	
Travel time of lift with up to 34 kg load	stroke > 0.9 m	➡ $\frac{\text{Stroke in m } -0.9}{1.5} + 1.2$ = travel time [s]	
Travel time for cycle*	= cycle time of Shuttle + 2 x travel time of lift = total cycle time		

* Shuttle moves in, lift travels, shuttle moves out and lift travels back.

LIFT DIMENSIONS



[1] Stroke in example diagram = 1000 mm
Shuttle platform top edge 900 mm
Please state lower position and maximum stroke when placing order

	Part no.
Lift	MT56976

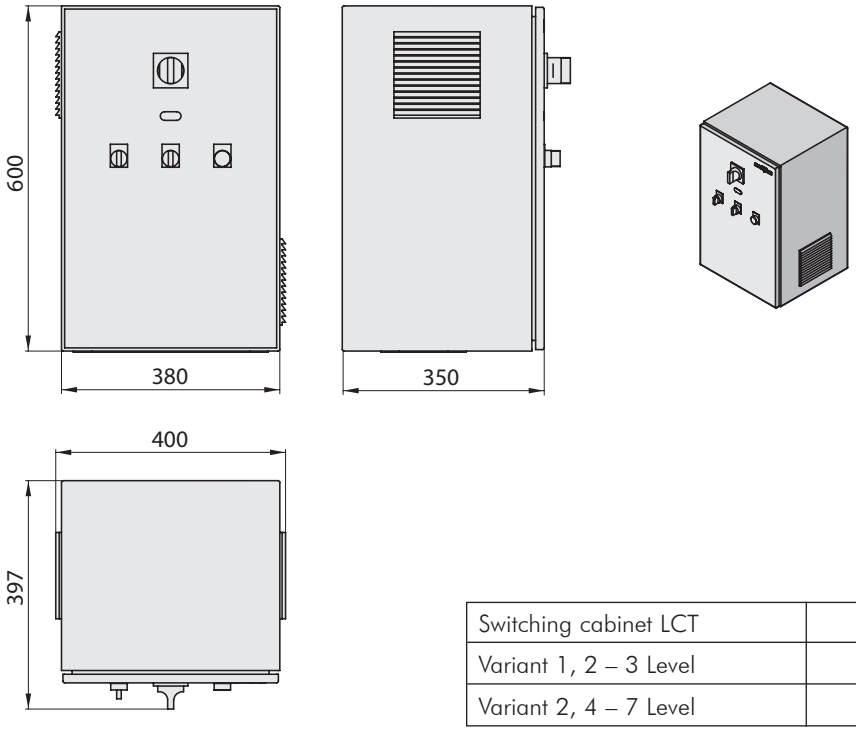
LIFT CONTROL SET MT58562 SPECIFICATIONS

SERVO-POSITIONER (9300 type EVS9322-EP)		
Nominal voltage Nominal current with mains filter	 [A]	3 x 380 – 480 V / 50 Hz / 60 Hz 2.5
Auxiliary voltage supply		24 V DC (-0 % +15 %); 5 A
Type of protection		IP 20
Installation type		Vertical (control cabinet)
Weight	[kg]	3.5
BRAKE UNIT (9350 type EMB9352-E)		
Supply voltage	[V DC]	270 – 775
Peak current for 60 s	[A DC]	42
Max. continuous current	[A DC]	25
Type of protection		IP 20
Installation type		Vertical (control cabinet)
Weight	[kg]	2.2
MAINS FILTER (type EZN3A1500H003)		
Rated voltage	[V DC]	500
Peak current for 60 s	[A DC]	42
Max. continuous current	[A DC]	25
Type of protection		IP 10
Installation type		Vertical (control cabinet)
Weight	[kg]	1.15
Ambiance: Temperature Rel. air humidity Air purity level	[°C]	10 to 40 Humidity class F without condensation (with relative moisture 85 %) normal workshop ambiance

LIFT CHAOS TECHNOLOGY LCT SWITCHING CABINET SPECIFICATIONS

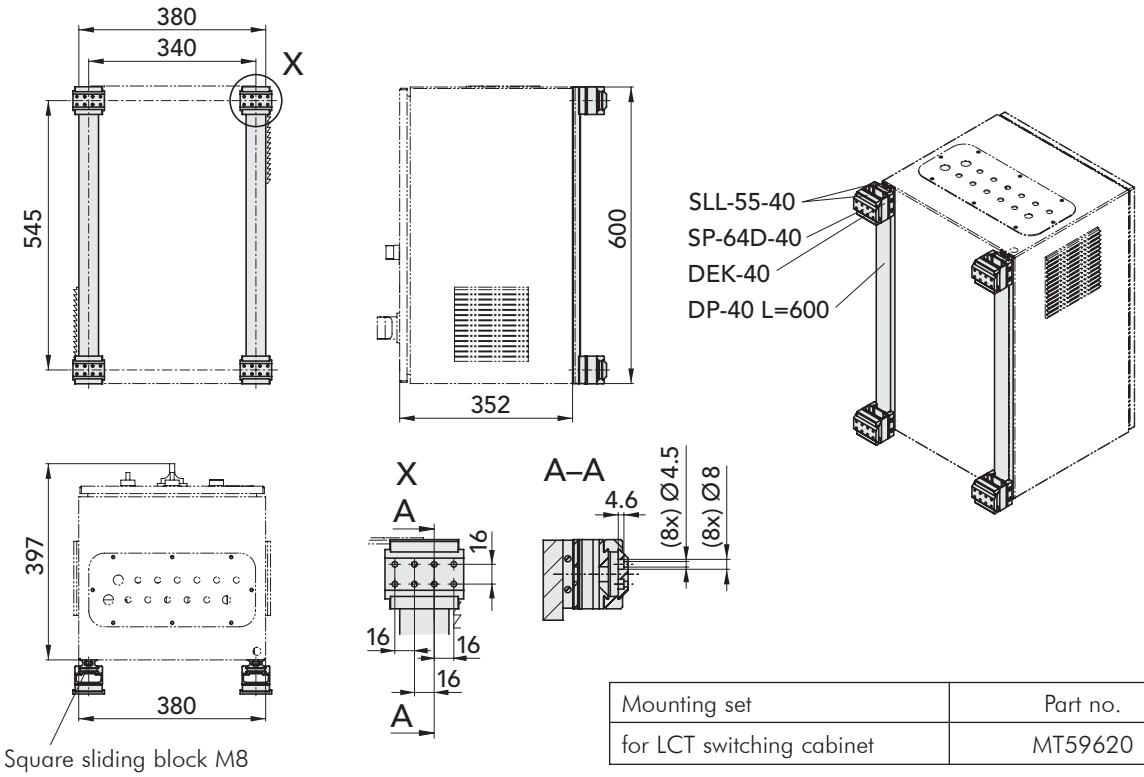
Nominal voltage	[V AC]	3 x 400 – 480 V / 50 Hz / 60 Hz
Nominal power	[W]	800
Type of protection		IP 21
Installation type		vertical
Weight	[kg]	32
Dimensions (L x W x H)	[mm]	600 x 380 x 350

SWITCHING CABINET LCT DIMENSIONS



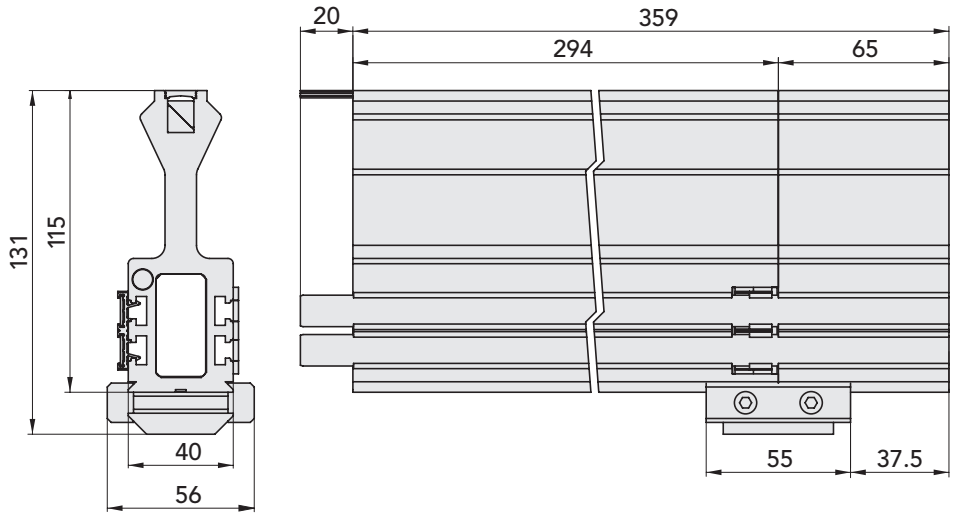
Switching cabinet LCT	Part no.
Variant 1, 2 – 3 Level	MT58558
Variant 2, 4 – 7 Level	MT58560

MOUNTING SET FOR SWITCHING CABINET LCT



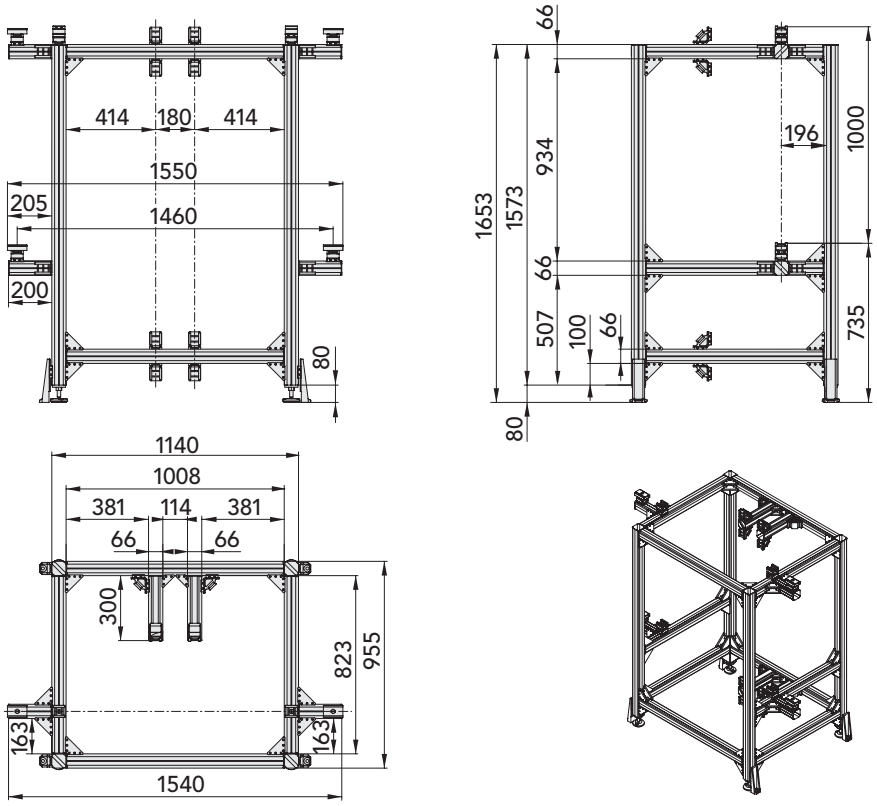
Mounting set	Part no.
for LCT switching cabinet	MT59620

L CONNECTION TRAC DIMENSIONS (R Connection Trac dimensional drawing, mirror inverted)



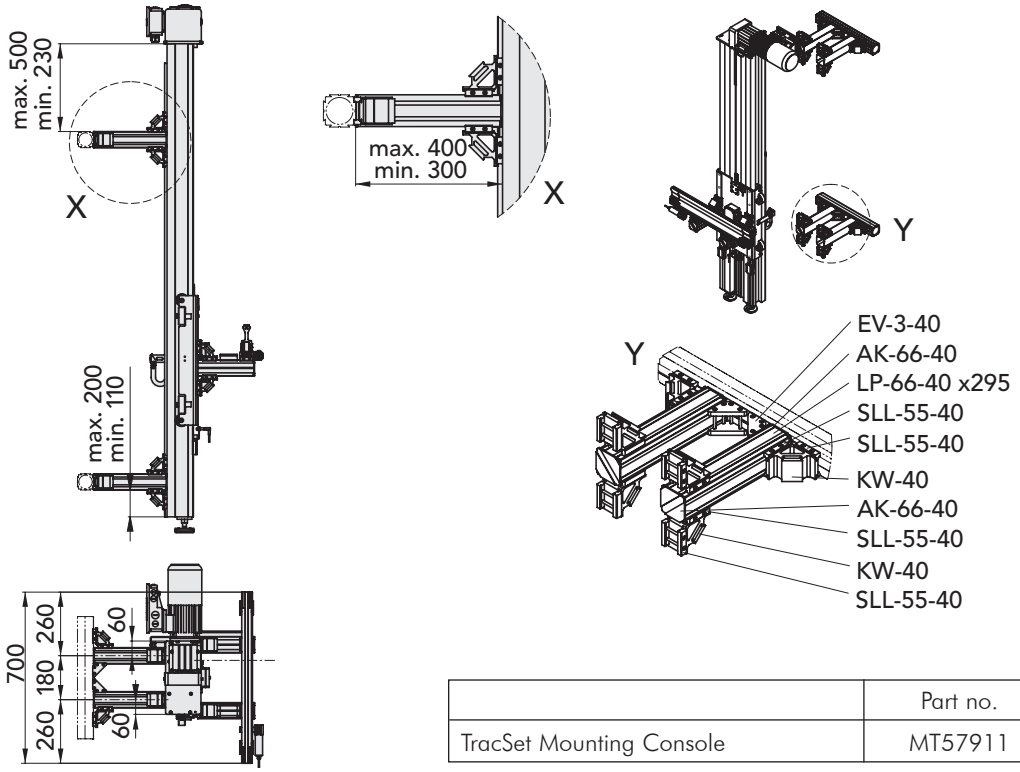
	Part no.
R Connection Trac, complete	MT57463
L Connection Trac, complete	MT57457

BASE FRAMEWORK FOR LIFT (without safety screens)



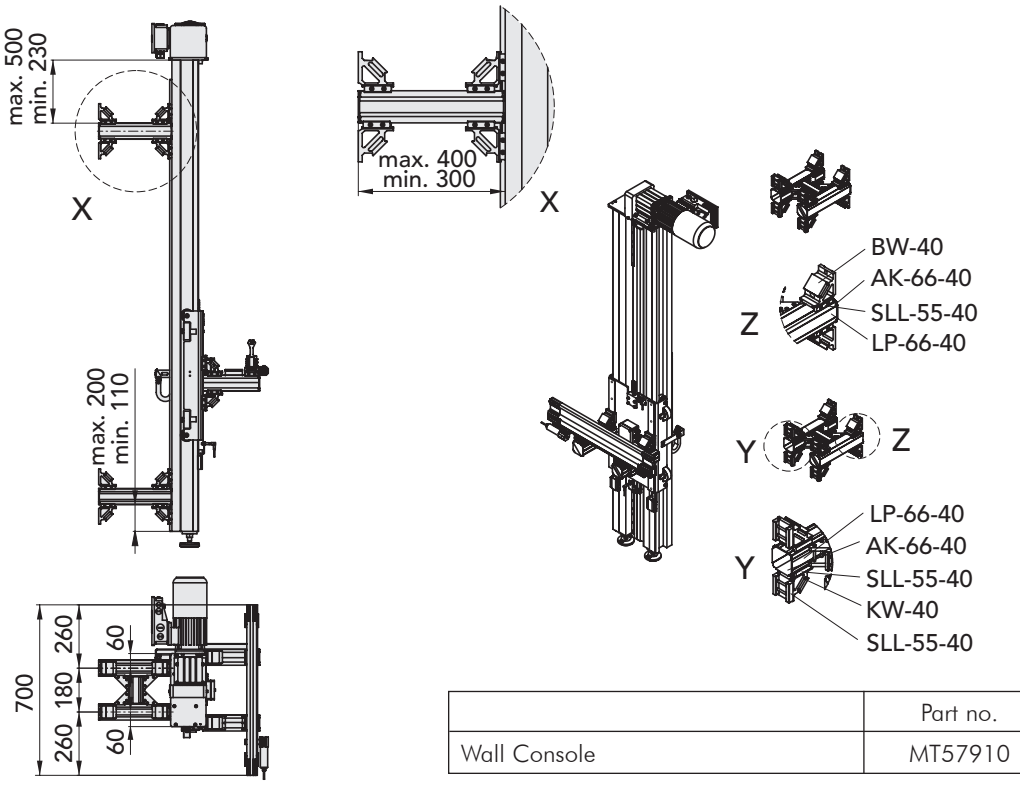
Sample Dimensions
for Lift
Upper edge of Shuttle
platform 900 mm
stroke 1000 mm

LIFT FIXTURE ON A TRACSET STRUCTURAL FRAMING



	Part no.
TracSet Mounting Console	MT57911

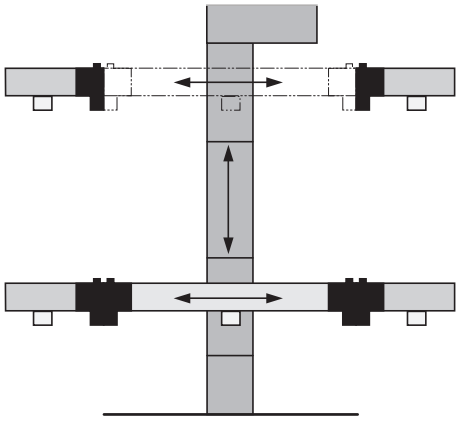
LIFT WALL MOUNTING



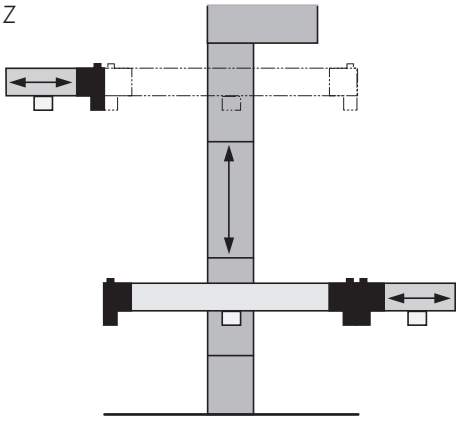
	Part no.
Wall Console	MT57910

EXTENSION OPTIONS FOR ANTI-FALL GUARD AND STOP

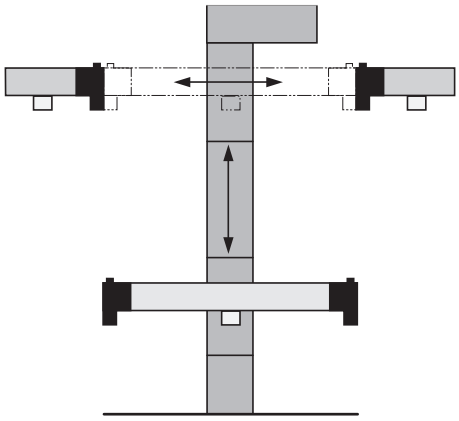
Lift X



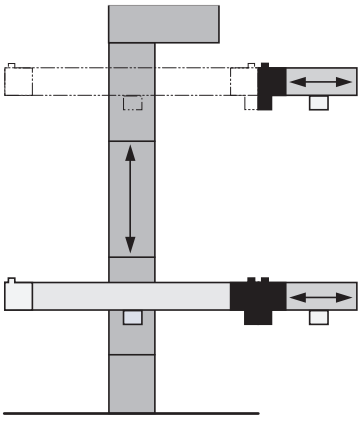
Lift Z



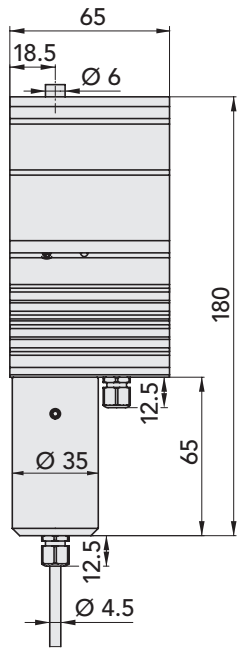
Lift T



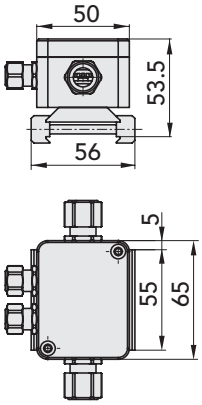
Lift C



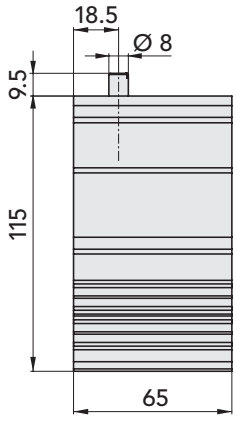
Anti-fall guard



Box



Limit stop



ACCESSORIES FOR LIFT

Description	Options	Part no.
R Connection Trac, complete		MT57463
L Connection Trac, complete		MT57457
Anti-fall guard		MT59422
Box for anti-fall guard		MT57644
Limit stop		MT57629
Trac with damper		MT57958
TC1-IRM Basic (with Y cable, AB- and A-Cam)		MT56936
A- and AB-Cam Set		MT90759
Motor line	5 meters 10 meters 20 meters	MT520319 MT520320 MT520321
Return system line	5 meters 10 meters 20 meters	MT520322 MT520323 MT520324
Return system line	10 meters 15 meters 20 meters	MT57470 MT57614 MT57615
Supply cable, wire number 7 (for 24 V DC supply voltage, servo control connection and external control)	10 meters 15 meters 20 meters	MT520360/10000 MT520360/15000 MT520360/25000
2-wire supply cable (for Trac power supply)	10 meters 15 meters 20 meters	MT520361/10000 MT520361/15000 MT520361/25000
Lift Control Set		MT58562
Control cabinet		MT58558
Control cabinet		MT58560
Keypad XT operating module (min. 1 per system)		MT520325
PC USB system bus adapter (if required)		MT520326
Profibus bus module (if required)		MT520445
PC system bus adapter RS 232 (if required)		MT520393
Wall console		MT57910
TracSet mounting console		MT57911
Base framework for lift		MT57912

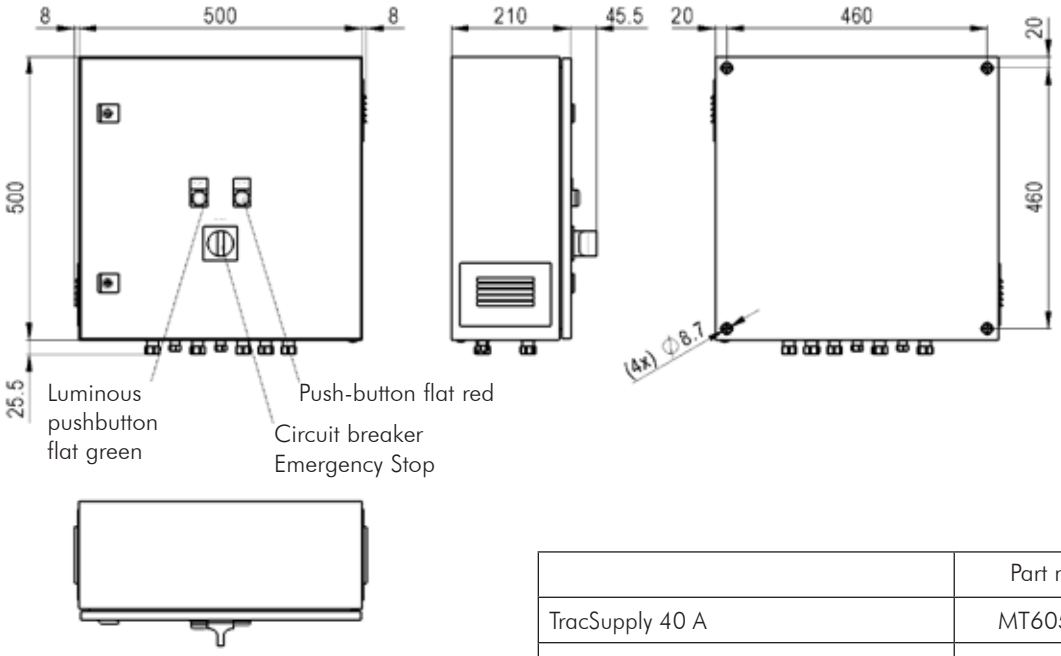
TRACSUPPLY

The TracSupply is used for supplying the power rails of the Montrac transport system with 24 VDC. Via these power rails the Shuttles are supplied with their energy during the ride. The output voltage is 24 V DC, short-circuit proof and open-circuit proof.
The TracSupply consists essentially of a power supply timed on the primary side, contactors and fuse elements. For operating it is equipped with a main switch, an illuminated button for switching on the supply and a button for switching off the supply. The TracSupply can also be switched on and off via PLC. The TracSupply available in two capacities, one with 40 ampere and one with 2x 40 ampere output current. In order to guarantee that never more than the allowed 40 ampere are connected to the rail system, the plant must imperatively be divided into sections by using IsolationTracs when having the stronger system version. The number of Shuttle axles used decides on the power of the TracSupply required for a plant.

TRACSUPPLY SPECIFICATIONS

			40 A power supply (24 axles)	2 x 40 A power supply (48 axles)
Input voltage		[V AC]	3 x 400	
Mains frequency		[Hz]	50–60	
Input voltage range		[V AC]	380–500	
Frequency range		[Hz]	47–63	
Switch-on current		[A]	≤ 25	≤ 2 x 25
Input power at nominal load		[kW]	1.25	2.5
Harmonic filtering			Integrated passive filter according to EN/EC 61000-3-2	
DC at output		[V DC]	24 – 28.8 adjustable	
Control accuracy of output voltage			1 – 3 % from set value	
DC at output max.		[A]	40	2 x 40
Output voltage ripple		[mV]	< 200	
Current limitation adjustable 10 – 110%		[A]	Max. 44	max. 2 x 44
Ambiance:	Temperature	[°C]	10 to 40	
	Rel. air humidity		5 % – 85 % (without condensation)	
	Air purity level		normal workshop ambiance	
Cooling			Natural air cooling	

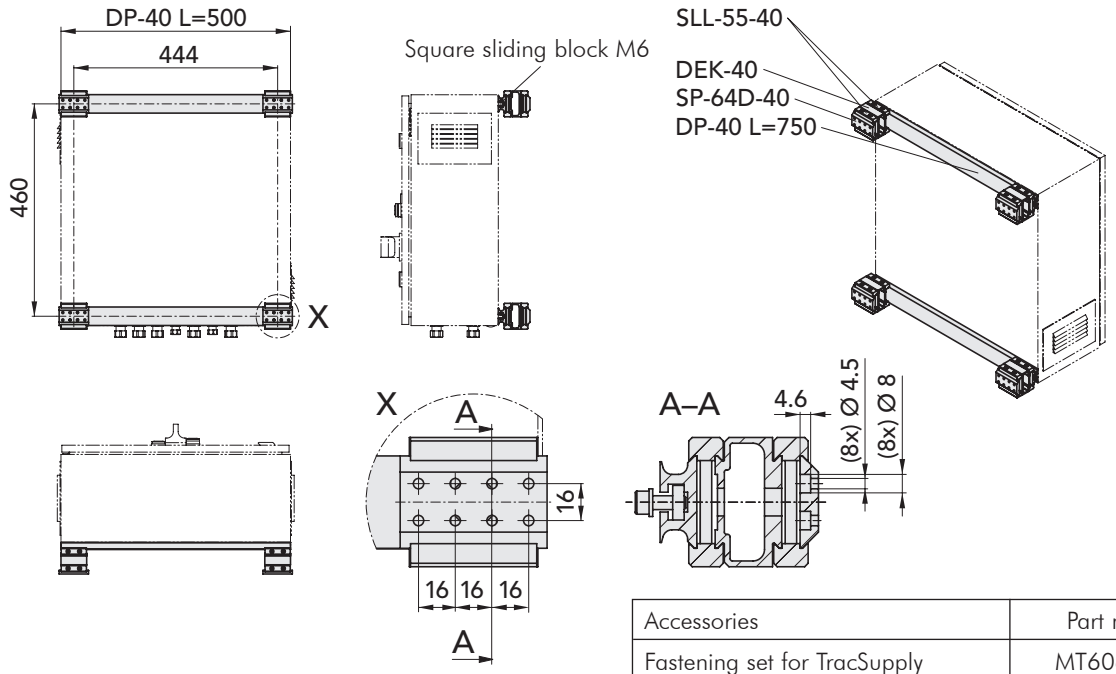
TRACSUPPLY DIMENSIONS



	Part no.
TracSupply 40 A	MT60506
TracSupply 2 x 40 A*	MT60508

* Use always in connection with IsolationsTrac

FASTENING SET FOR POWER SUPPLY



Accessories	Part no.
Fastening set for TracSupply	MT60692
Supply cable 10 m	MT57577
Supply cable 30 m	MT57578

ISOLATIONTRAC

If the power requirement for a larger plant with many Shuttles is bigger than 40 A, the plant supply must be divided up into appropriate sections. These are supplied by a separate supply unit each. These sections are electrically decoupled from one another by IsolationTracs. Consequently, in the event of short-circuit on one of the sections, only the maximum current of the power supply unit connected to this section can flow.
The IsolationTracs are supplied by means of DC/DC converters.

These DC/DC converters are connected on the input side to the power rails of an installation section and on the output side to the IsolationTrac. The DC/DC converter limits the current on the IsolationTrac to max. 4.2 A. This current is sufficient for starting a Twin-Axle Shuttle.
There are two IsolationTrac versions: the IsolationTrac 300 mm and the IsolationTrac 660 mm.
IsolationTrac 300 mm is used in systems in which Shuttles are operated by a driven axle (incl. Shuttle with rear axle empty).

IsolationTrac 660 mm is used in systems in which Shuttles are operated by two driven axles (Twin-Axle Shuttle).

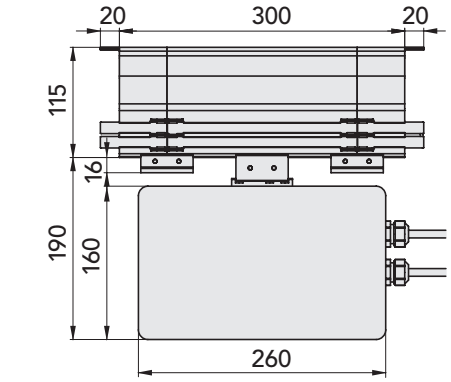
ISOLATIONTRAC SPECIFICATIONS

Nominal voltage		[V DC]	24
Current carrying capacity		[A]	40
Material			Aluminum, copper, steel, plastic, rubber
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 % – 85 % (without condensation)
	Air purity level		normal workshop ambiance

DC/DC CONVERTER SPECIFICATIONS

Input voltage		V DC]	24
Operating range		[V DC]	19 – 36
Nominal input current		[A]	5.4
Input power		[W]	129.2
Output voltage		[V DC]	24
Control accuracy of output voltage		[%]	± 0.2
DC output current		[A]	4.2
Output power		[W]	100.8
Output voltage ripple		[mVpp]	150
Material			Aluminum, copper, steel, brass, plastic
Humidity class according to DIN 40040			F (no condensation)
Cooling			Natural air cooling
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 % – 85 % (without condensation)
	Air purity level		normal workshop ambiance

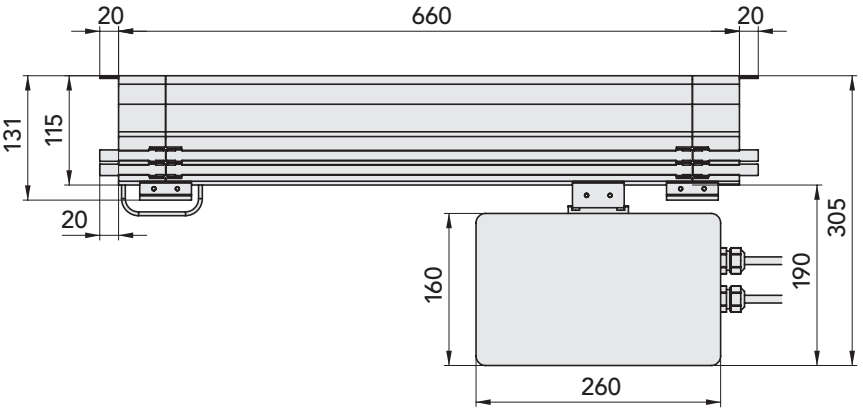
ISOLATIONTRAC DIMENSIONS



	Part no.
IsolationTrac 300*	MT56945
IsolationTrac 660*	MT56946

*including DC/DC converter

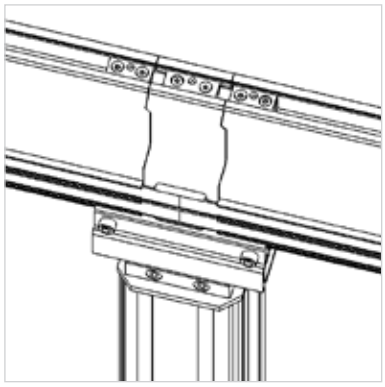
	Part no.
DC/DC converter	MT506859



MONTRAC PLANT GROUNDING CONCEPT

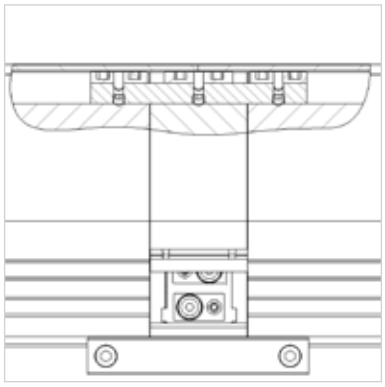
The rail system of the Montrac transport system is mounted on individual TracSet base frames. Contrary to conventionally manufactured welded steel frameworks these aluminum profile constructions are not generally joined together with electrically conductive connections.

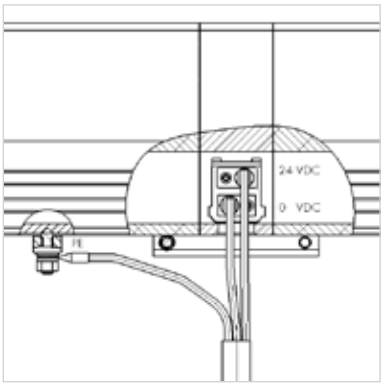
TracSet supplies in its product range grounding elements by which a permanent, electrically conducting connection among the individual components can be created. Thus additionally attached components such as grounding strips are not necessary, which has a positive impact for the appearance of the whole plant.



TRACLINK TRANSITION

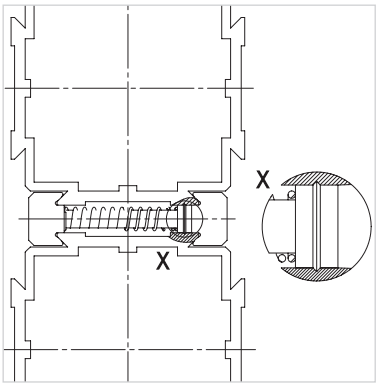
The Trac sections are mechanically connected via the clamping bracket of the TracLink. In addition the entire rail system is grounded by screwing in the grub screws into the clamping bracket.

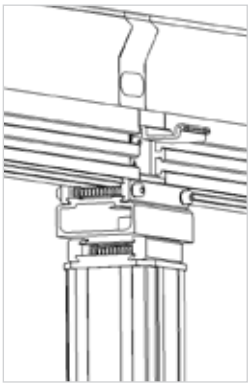


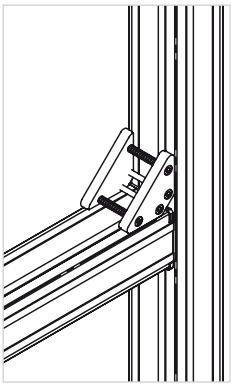


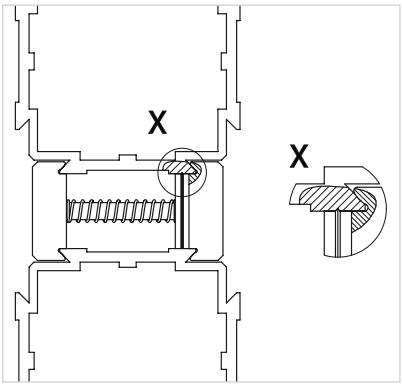
GROUNDING CONNECTION

The grounding conductor is led with the supply line from the switching cabinet to the plant. The connection to the system is made by using the grounding element ERE-40.





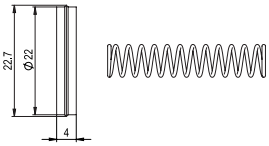




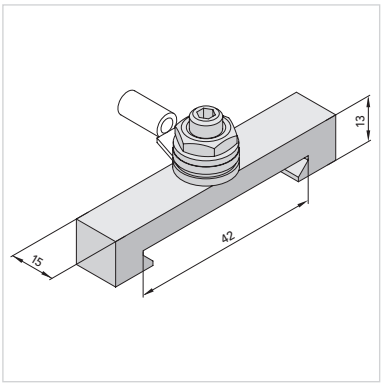
GROUNDING CONTACT ELEMENT

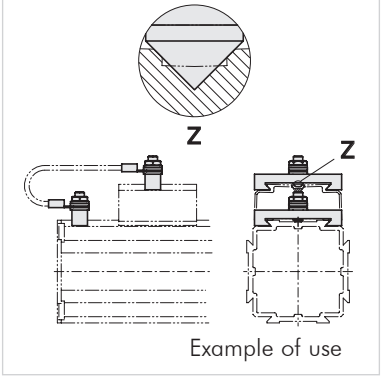
By mounting the grounding contact elements a conducting connection via the TracSet clamping elements is generated.

GROUNDING CONTACT ELEMENT SPECIFICATIONS

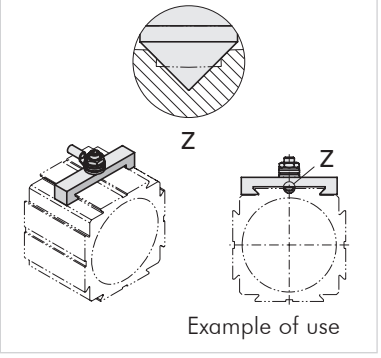
	CONTACT ELEMENT GROUNDING ø 7.8	CONTACT ELEMENT GROUNDING ø 7	CONTACT ELEMENT GROUNDING ø 22
Use: If electric cables with voltages >50 V AC or 75 V DC are laid directly on TracSet profiles, the profiles must be grounded.			
The conversion kit applies to the following clamping elements	SLL-12-40, SLL-20-40, SLL-55-40	EV-2-40, EV-3-40, EV-4-40 EV-3/45-40, EVD-4-40, KV-40, SLR-15-40	SLL-55/22-40, SLL 20/22-40
Weight [kg]	0.010	0.010	0.013
Part no.	MT55105	MT65992	MT65991

GROUNDING ELEMENT ERE-40





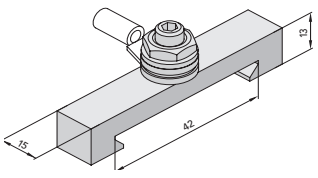
Example of use



Example of use

By screwing in the grub screw into the corner connections the isolating anodized coating is destroyed at the connection points. This ensures an electrically conductive connection between the individual aluminum profiles of the base frame. The eye of the ground cable is fixed with the hexagon nut on the projecting thread shaft.

GROUNDING ELEMENT SPECIFICATIONS

	GROUNDING ELEMENT ERE-40
Use: If electric cables with voltages >50 V AC or 75 V DC are laid directly on TracSet profiles, the profiles must be grounded.	
The conversion kit applies to the following clamping elements	–
Weight [kg]	0.030
Part no.	MT54960N

TRACSET BASE FRAMES

Appropriate base frames are available for all Montrac components.

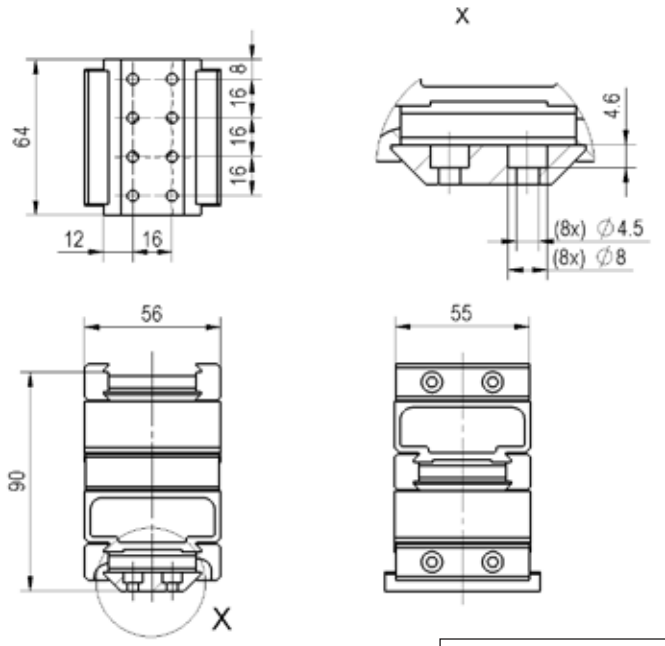
The base frames have a modular design such as the rail system.

If necessary, the height of the base frames can be adapted to customers wishes.

TRACSET BASE FRAMES SPECIFICATIONS

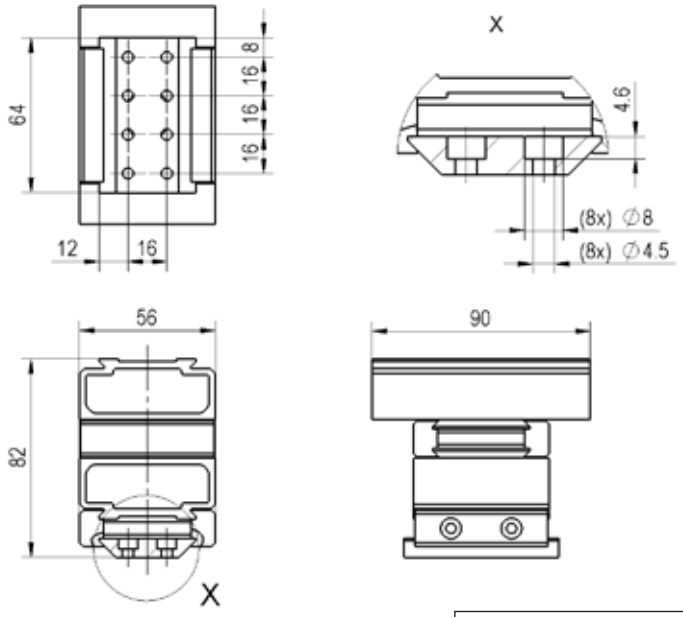
Material			Aluminum, nickel-plated copper, steel, brass, plastic
Ambiance:	Temperature	[°C]	10 to 40
	Rel. air humidity		5 % – 85 % (without condensation)
	Air purity level		normal workshop ambiance

TS BASE FRAME FOR TRAC/TABLETOP



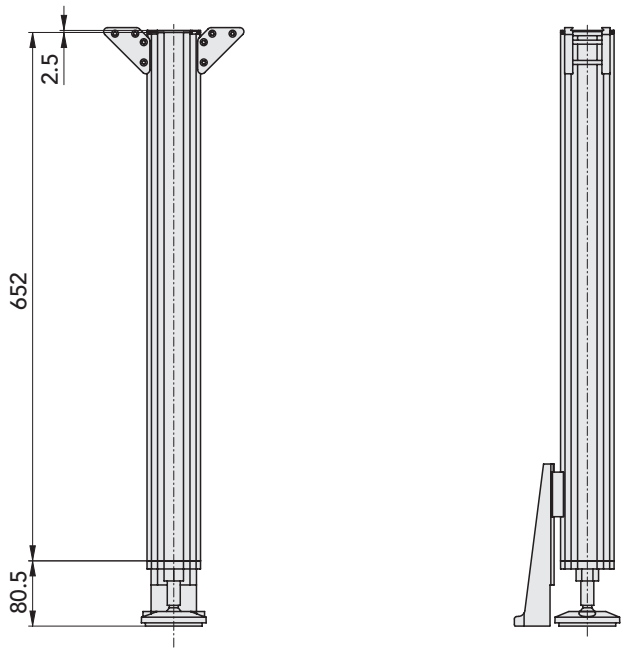
	Part no.
TS base frame for Trac/tabletop	MT54819

TS BASE FRAME FOR TRACLINK/TABLETOP



	Part no.
TS base frame for TracLink/tabletop	MT57431

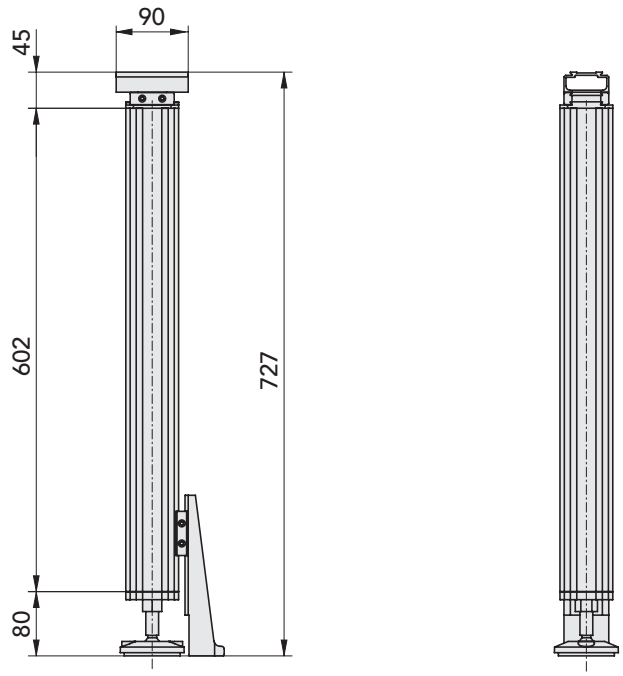
SINGLE LEG SUPPORT FOR TRAC



900 mm to top edge
of Shuttle platform

	Part no.
Single leg support for Trac	MT91565

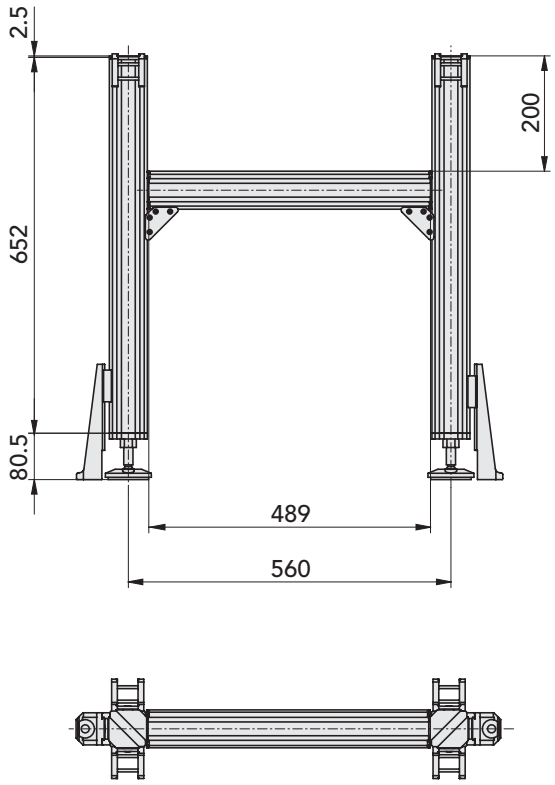
SINGLE LEG SUPPORT FOR TRACLINK

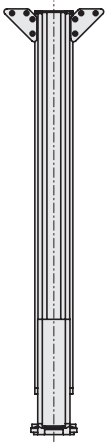


900 mm to top edge
of Shuttle platform

	Part no.
Single leg support for TracLink	MT56817

DOUBLE LEG SUPPORT FOR TRAC-TRAC

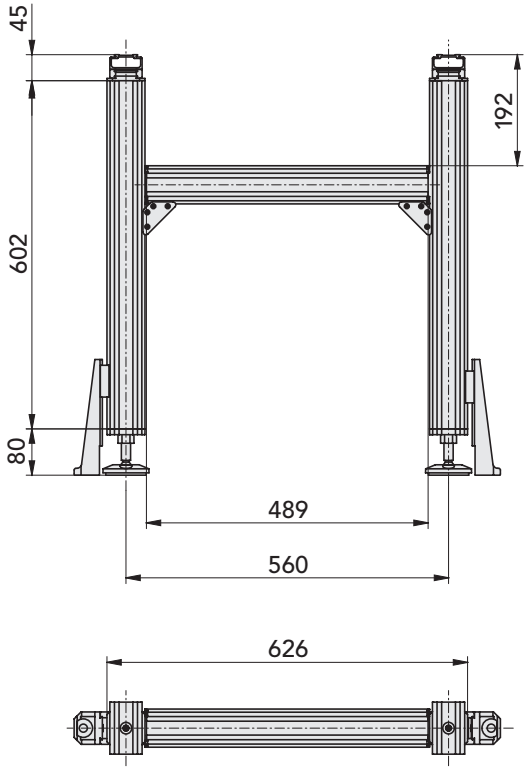


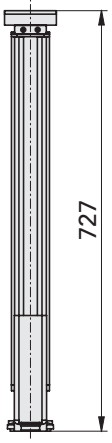


900 mm to top edge
of Shuttle platform

	Part no.
Double leg support for Trac-Trac	MT91569

DOUBLE LEG SUPPORT FOR TRACLINK-TRACLINK

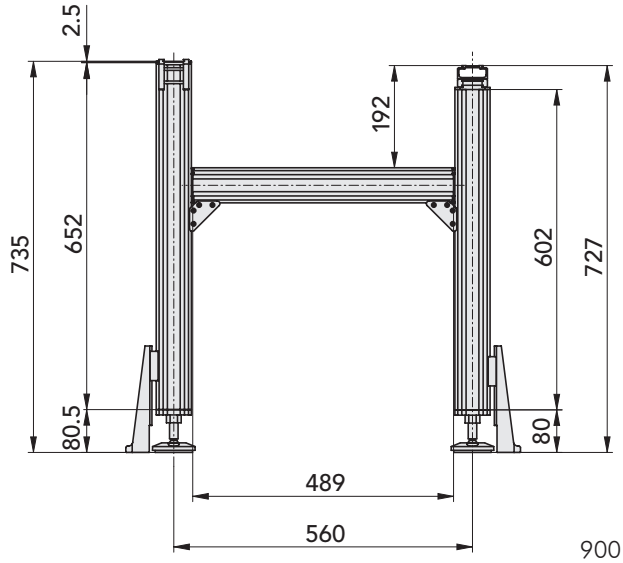


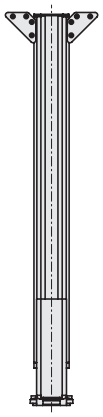


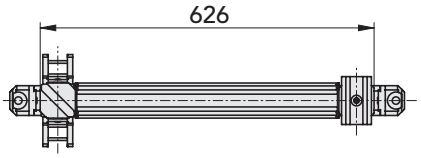
900 mm to top edge
of Shuttle platform

	Part no.
Double leg support for TracLink-TracLink	MT58298

DOUBLE LEG SUPPORT FOR TRACLINK-TRAC



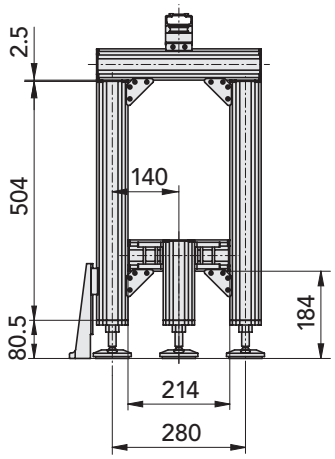


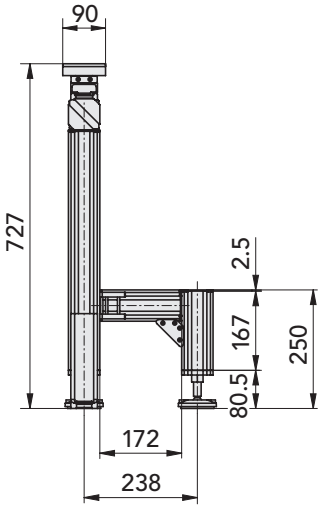


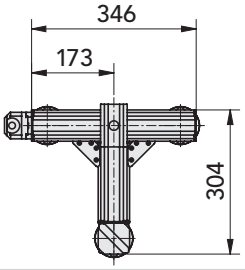
900 mm to top edge
of Shuttle platform

	Part no.
Double leg support for TracLink-Trac	MT58299

3-LEG SUPPORT FOR TRACLINK (FOR LONG LINES)



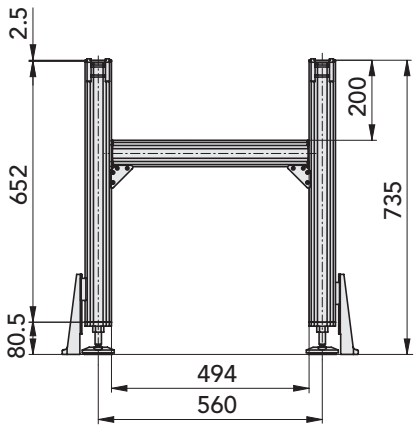


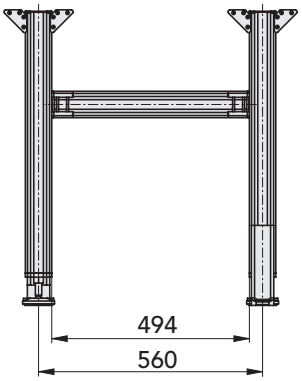


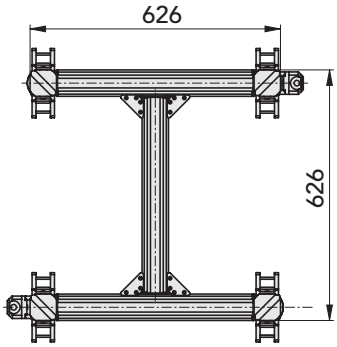
900 mm to top edge
of Shuttle platform

	Part no.
3-leg support for TracLink	MT57948

4-LEG SUPPORT



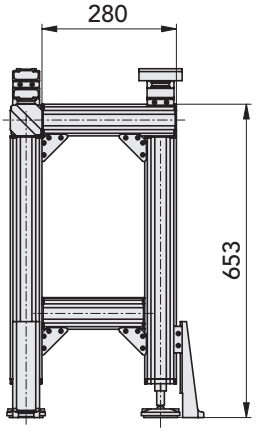


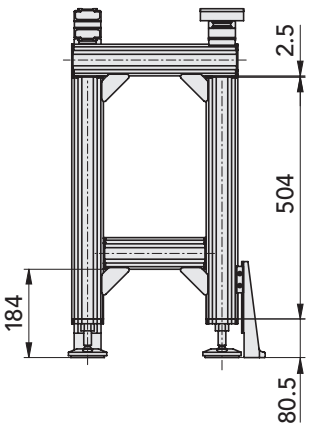


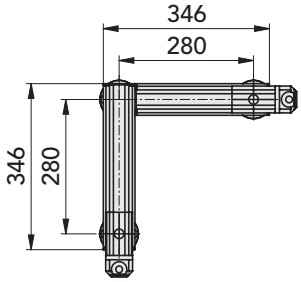
900 mm to top edge
of Shuttle platform

	Part no.
4-leg support	MT58301

TS BASE FRAME TYPE L (e.g. for supporting a 90° TracCurve)



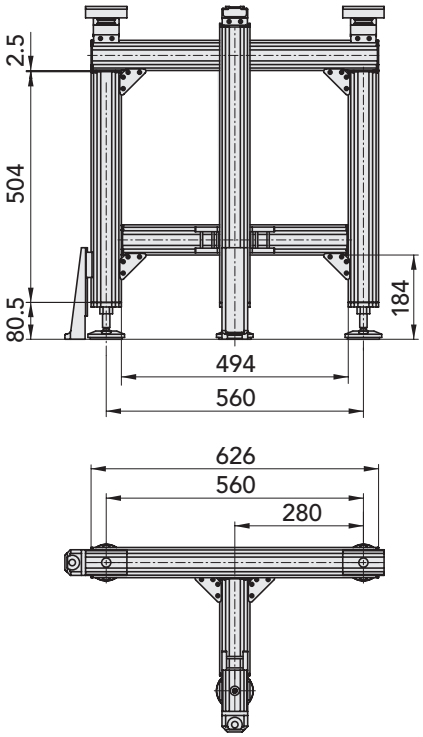


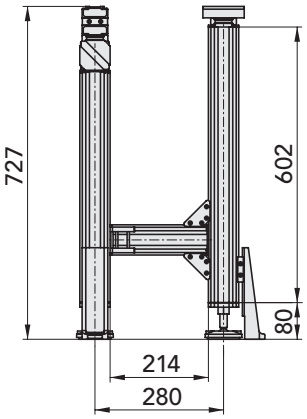


900 mm to top edge
of Shuttle platform

	Part no.
TS base frame type L	MT56818

TS BASE FRAME TYPE T (e.g. for 2 x TracCurve 90°/TracSwitch/TracCrossing)

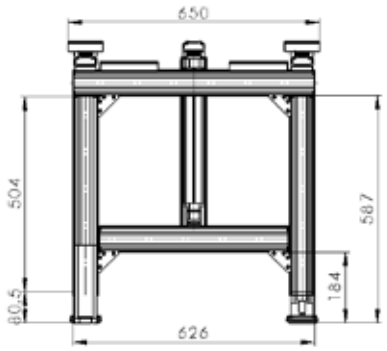


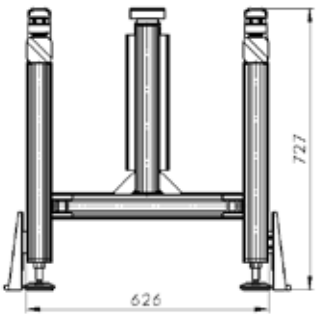


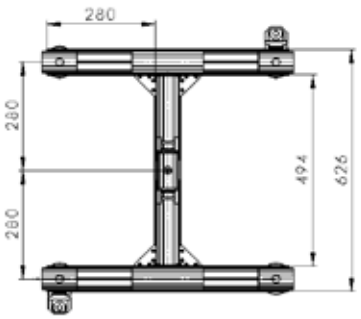
900 mm to top edge
of Shuttle platform

	Part no.
TS base frame type T	MT56584

TS BASE FRAME TYPE H



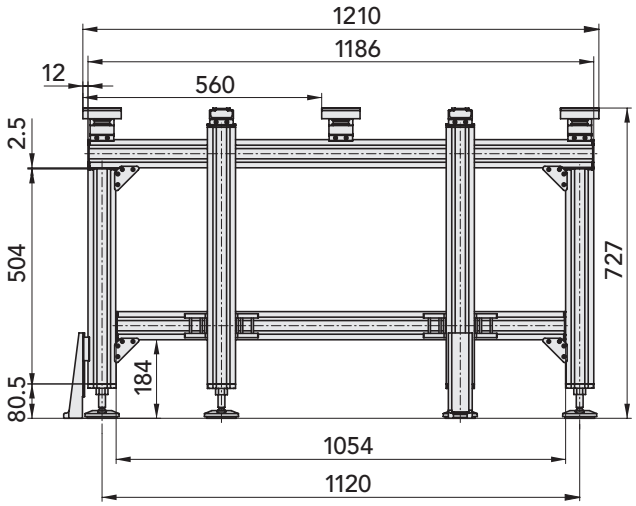


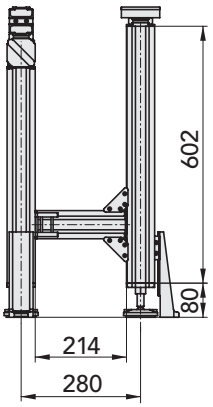


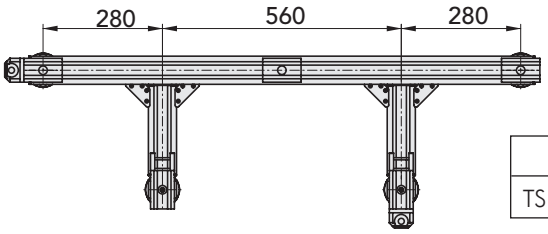
900 mm to top edge
of Shuttle platform

	Part no.
TS base frame type H	MT58230

TS BASE FRAME FOR DOUBLE TRACSWITCH



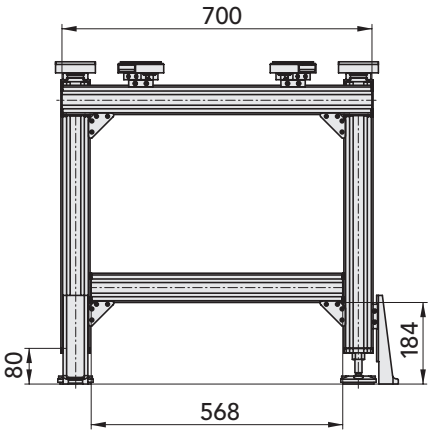


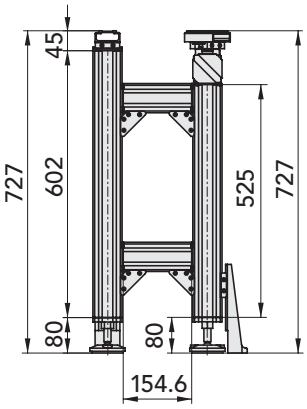


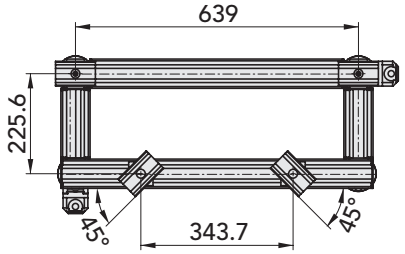
900 mm to top edge of Shuttle platform

	Part no.
TS base frame for double TracSwitch	MT56826

TS BASE FRAME FOR TRACSWITCH ARENA



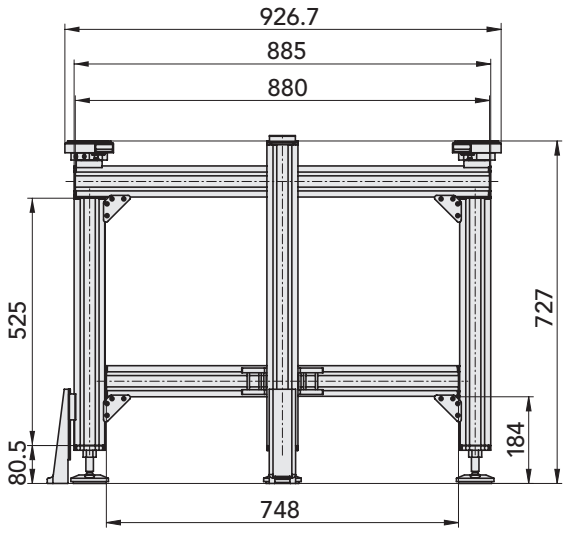


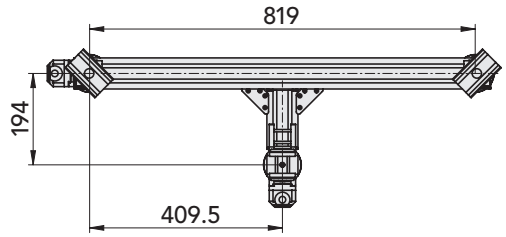


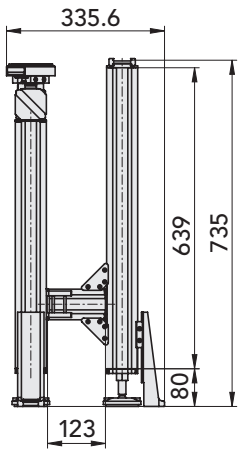
900 mm to top edge of Shuttle platform

	Part no.
TS base frame for TracSwitch Arena	MT57671

TS BASE FRAME FOR TRACCURVE 90° R520



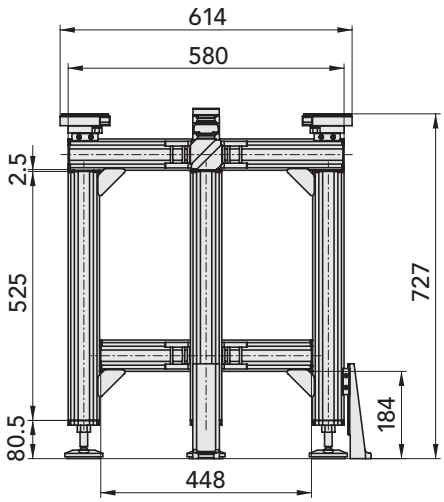


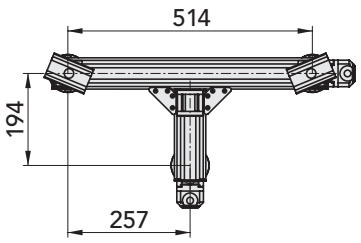


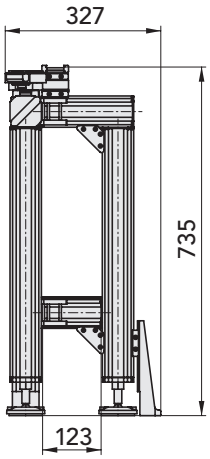
900 mm to top edge of Shuttle platform

	Part no.
TS base frame for TracCurve 90° R520	MT58580

TS BASE FRAME FOR TRACCURVE 45° R520



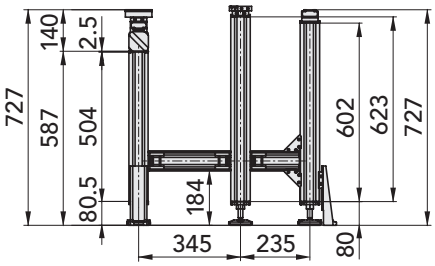


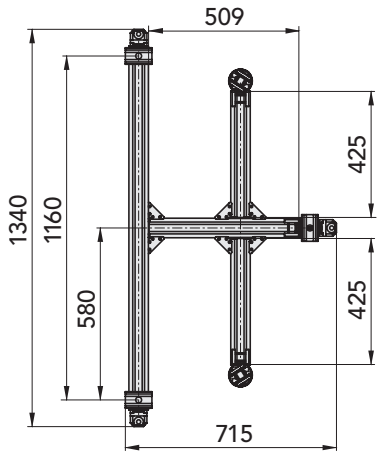


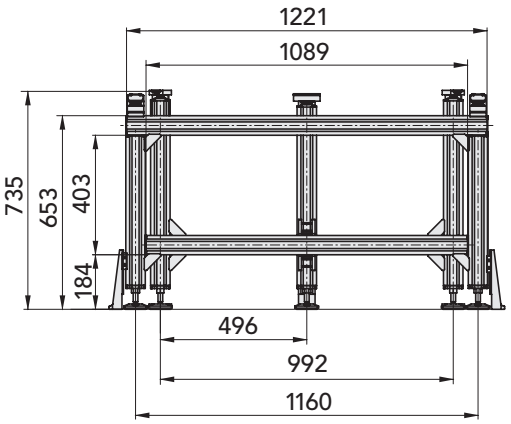
900 mm to top edge of Shuttle platform

	Part no.
TS base frame for TracCurve 45° R520	MT58589

TS BASE FRAME FOR TRACCURVE 180° R520







900 mm to top edge
of Shuttle platform

	Part no.
TS base frame for TracCurve 180° R520	MT58642

ACCESSORIES FOR TRACSET BASE FRAMES

	Part no.
Segment anchor M 12 x 80 / 5	MT507557
Cable duct KFM-40, L=2000 mm	MT45229N2000
Cable duct KFM-40, L=0025 mm	MT45229N0025

SPECIAL COMPONENTS

Customer-specific special components are listed further down. The development engineers of the montratec AG are pleased to offer support and guidance in the implementation of special solutions. The contact details are shown on the back of this catalog.

SHUTTLE MSHI-4 INDUCTIVE

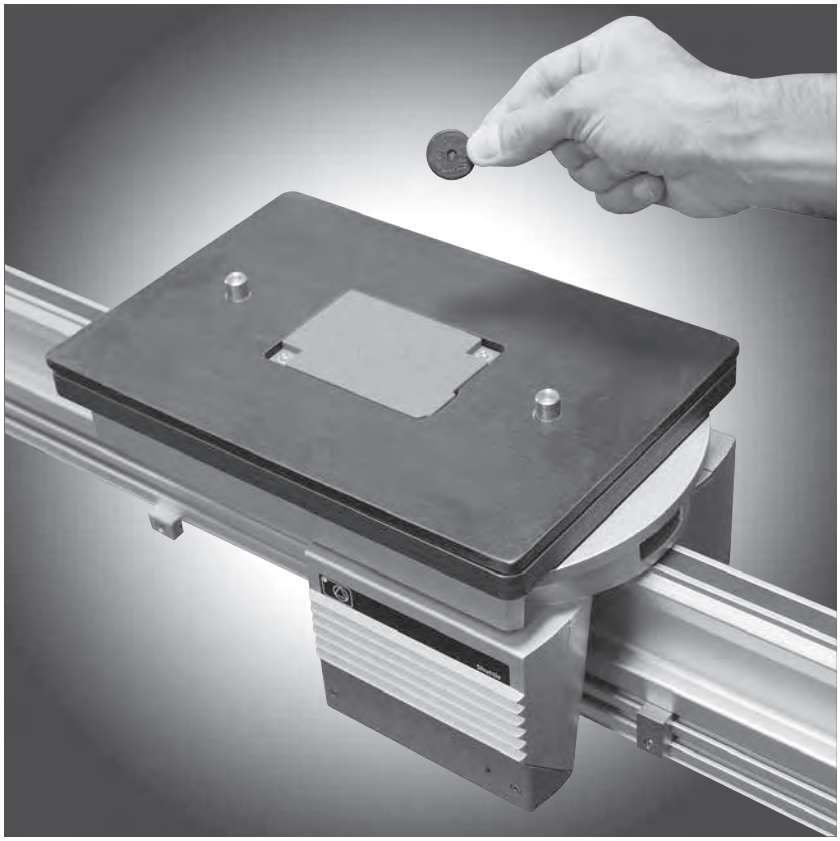
Owing to their special shape the Shuttles are self-centered on the monorail. Driven by a maintenance-free low-voltage electric motor that is fed by an inductive (non-contact) energy transmission they reach a speed of 30 m/min.
Each Shuttle has its own control system, which receives its commands from the control cams on the Trac. Possible collisions with other Shuttles or obstacles are detected by an integrated sensor and prevented by appropriate control commands. The Shuttles are characterized by their smooth running and minimum energy consumption. The platforms on which the workpieces are accommodated can be lifted off the Shuttles. The Shuttle MSHI-4 Inductive is mainly used in the cleanroom, for manufacturing sensitive products such as hard disks, wafers or medical products.

RFID-SHUTTLE

With the RFID Shuttle, the transported product (not the Shuttle as before) determines the route through the transport system.

Attached to the product on the Shuttle there is a tag or transponder containing a code with the route through the Montrac system.

The RFID Shuttle provides added automation streamlining of the material flow.



BELT LIFT

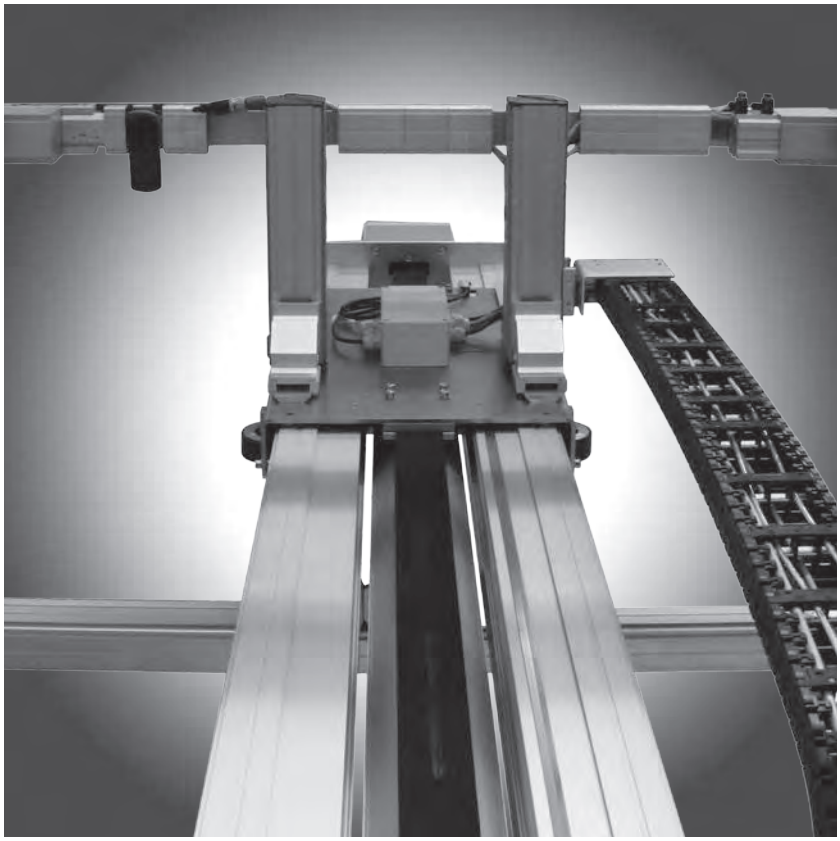
The belt lift has been optimized for cleanroom applications and allows the vertical transport of Shuttles. This special lift is reliable as well as maintenance-free and extremely dynamic and precise.

Thus the following jobs can be managed:

– Connecting two or more systems of different work heights

– Taking Shuttles from a station to a ceiling system or vice versa.

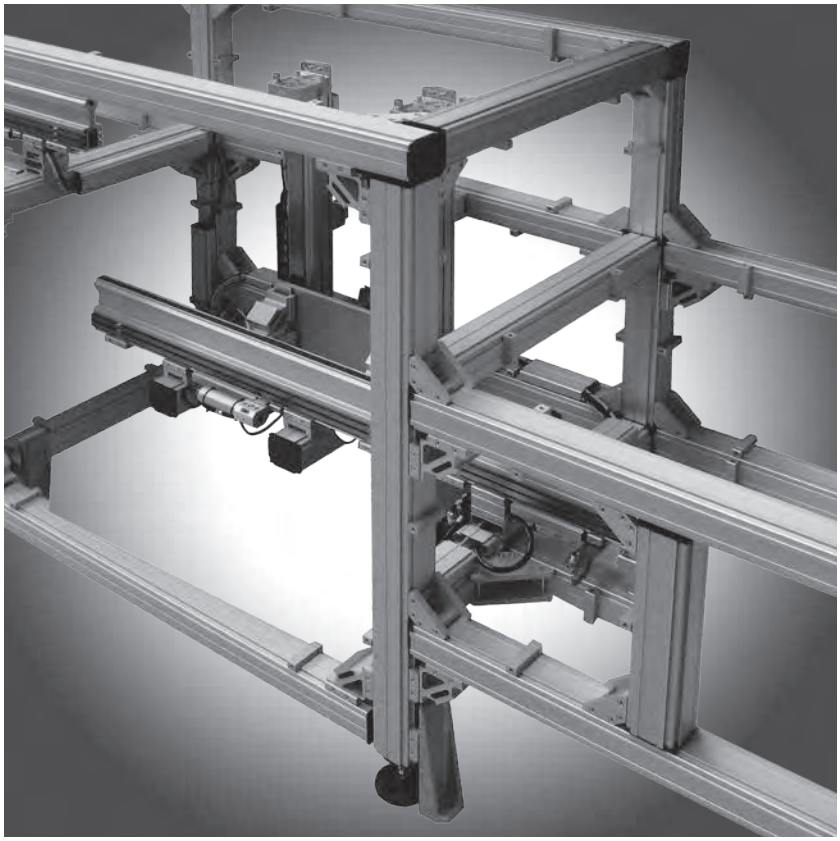
Protection of employees in the lift area is imperative.



PNEUMATIC LIFT

The pneumatic lift allows the vertical transport of the Shuttles.
This compact and space-saving lift is easy to operate and has been especially designed for small height differences.
The lift is especially low-maintenance as well as durable, thus very cost efficient.

Protection of employees in the lift area is imperative.

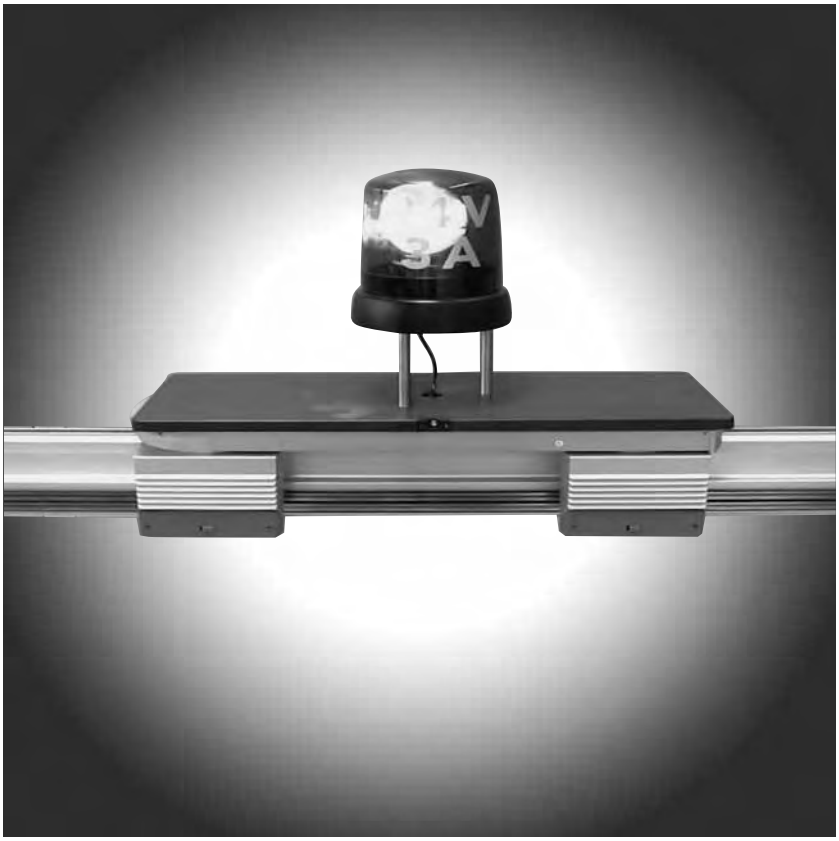


SHUTTLE WITH ADDITIONAL POWER SUPPLY

24 V / 3 A can be supplied on the Shuttle. The Twin-Axle Shuttle with empty back axle serves as the basis.

The power supplied for an additional component located on the Shuttle can be collected via an additional current collector built-in in the back axle.

The Shuttle with power supply is used in different industrial sectors, e.g. for autonomous loading or unloading of a Shuttle with transport belt.

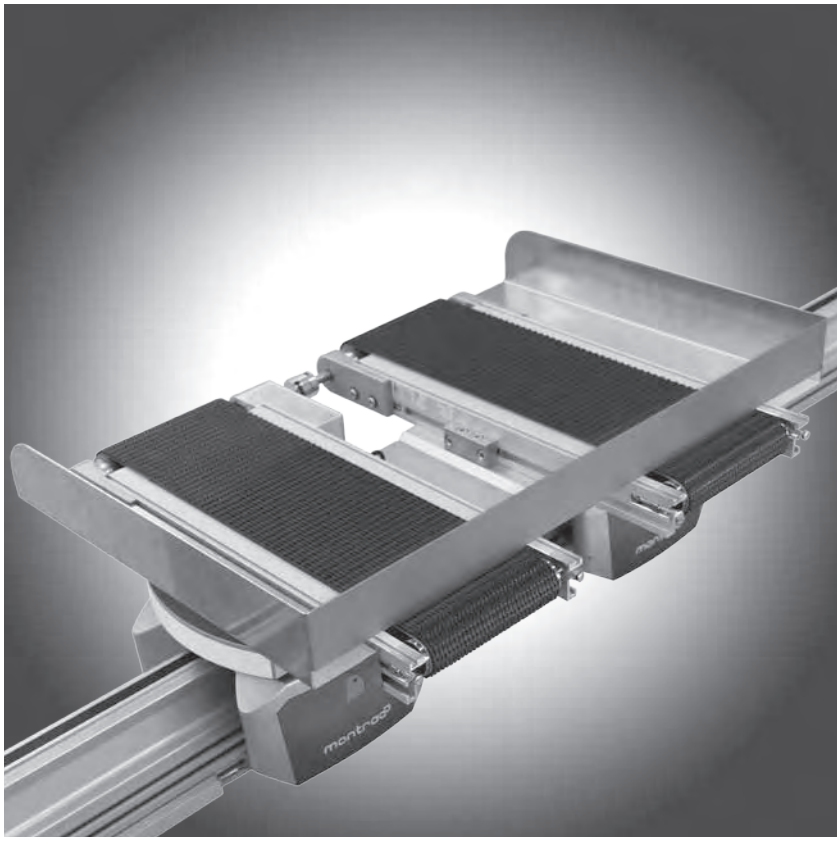


SHUTTLE WITH TRANSPORT BELT

Transport belts adapted to special requirements are firmly attached to the Shuttle.

Thus every Shuttle carries along the loading and unloading unit whereby partially complex handling stations become unnecessary.

The power for the transport belt is directly supplied via the Shuttles (24 V / 3 A).



FLEXTRAC

Montrac manages to overcome certain height differences with the FlexTrac, e.g. between machines and processing stations, without using a lift.

Depending on the application different ascent angles are possible.

SCALES MODULE

The scales module consists of a SupoTrac with integrated high precision scales from Eilersen and a base frame which is independent of the Trac.

The workpiece platforms are lifted and can be weighed exactly down to 1 gram vibration-free, depending on the required weight range.

The scales features a RS-486 or a Profibus interface.

This module is especially used in the intralogistics and also for assembly processes as check weigher.

TRACSET

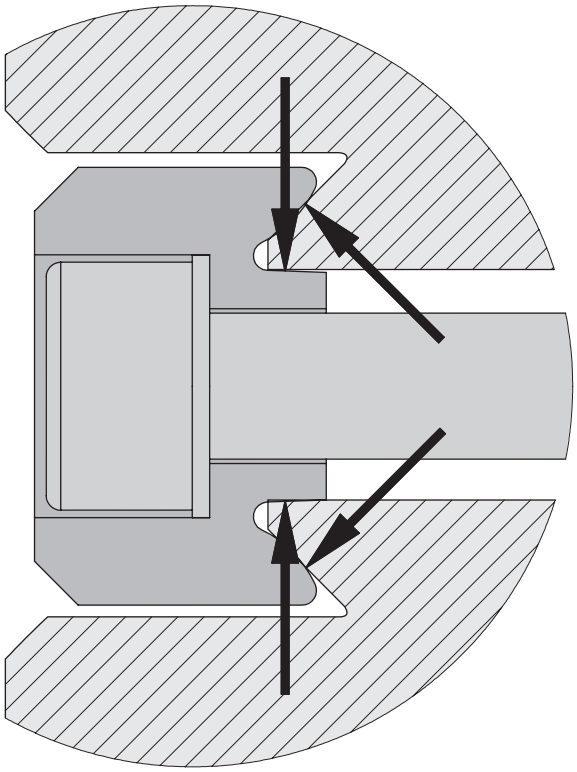
TracSet is a patented assembling system, with cross-product compatibility and flexibility. Its proven dovetail mounting system permits quick and easy assembly of all montrac components.

TracSet – a technology with countless possibilities.

Advantages of TracSet:

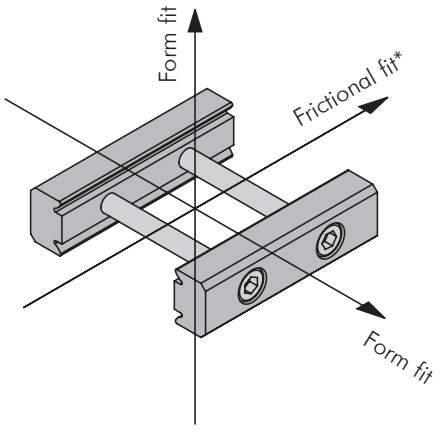
- Precise, heavy duty, vibration-proof connection
- Suitable for static and dynamic application
- With the screws tightened to 6 Nm torque, the resistance to displacement for the two interconnected profiles is 3000 N.
- An Allen key is sufficient for assembly

ROBUST AND FLEXIBLE



Precise, heavy duty, vibration-proof connections between two elements with dovetail geometry by means of clamping elements. For static as well as dynamic use.

* With the screws tightened to 6 Nm torque, the resistance to displacement for the two interconnected profiles is 3000 N.

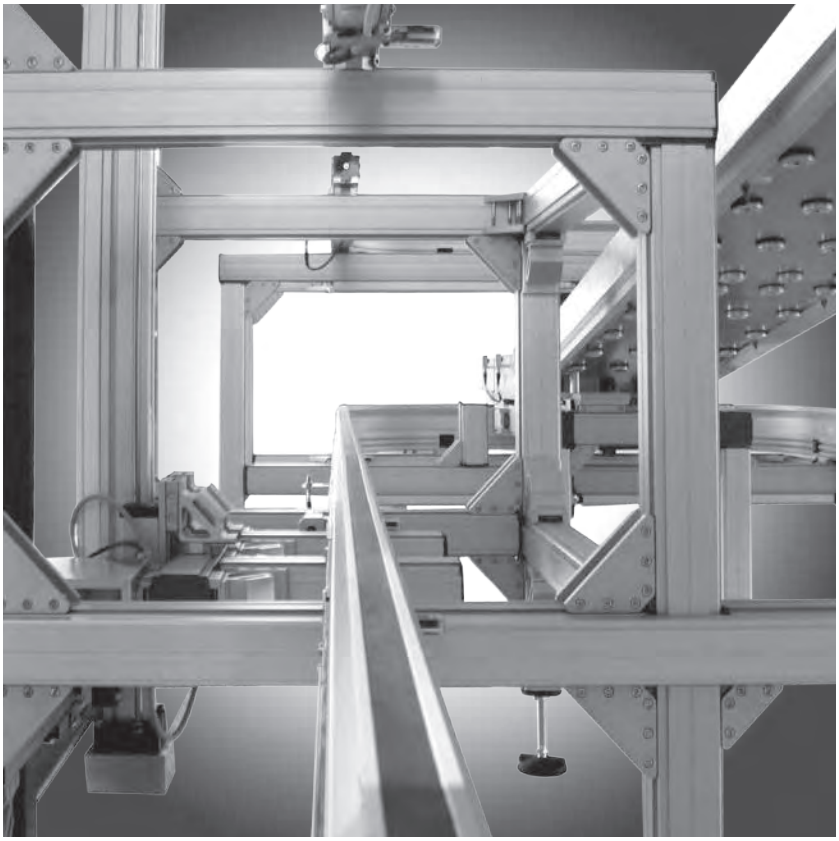


TracSet is a universal modular system for structural framing. The system allows quick assembly without mechanical processing of the profile ends. With a minimum of individual elements (10 basic components) a great variety of assembling possibilities is possible.

TracSet can be adjusted easily, quickly and flexibly. No drilling and no pinning are necessary.

TracSet is suitable for precise and dimensionally stable connections.

Its dovetail connections can be subjected to larger loads than the T-slot connections. With the screws tightened to the correct torque the resistance to displacement for two interconnected profiles is 3000 N.



Easy, fast and flexible

Variety

Precise and dimensionally stable

TracSet connections are vibration proof and therefore highly suitable for demanding applications.

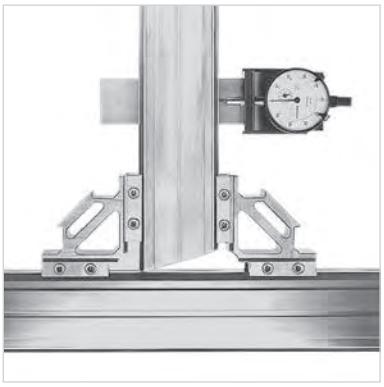
The connections are precise, regardless of the profile end processing.

TracSet allows to set up linear connections as well as connections with adjustable angles.

Its high flexibility permits the structural frames to be subsequently reinforced (vertical supports/ horizontal bars/diagonal struts).

All the clamping screws in the structural framing are always accessible. The base frames are easy to disassemble at a later time for reuse; thanks to the clamping connections no drill holes are necessary.

Vibration-proof



Precise

Accessible

Angle adjustable

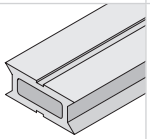
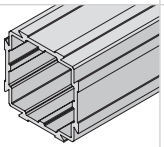
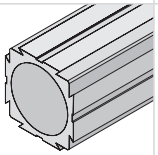
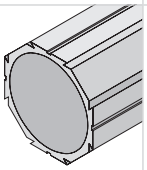
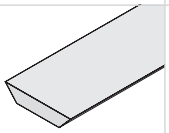
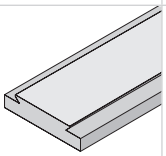
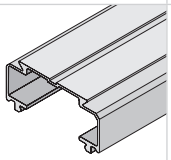
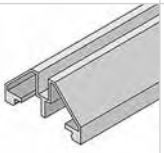
Vertical

Diagonal

Can be subjected to high loads

Reusable

TRACSET COMPONENTS OVERVIEW

Figure	Description	Abbreviation	Part no.	Page
	Support profile	TP-16-40	MT44207N2000	141
	Light profile	LP-66-40	MT49260N3000	142
	Support profile	TP-66-40	MT42852N3000	143
	Support profile	TP-96-44	MT43207N3000	144
	Adapter profile	AP-40-40	MT41258N2000	146
	Adapter profile	AP-56-40	MT46253N2000	146
	Multiple cable duct	KFM-40	MT45229N2000	147
	Fixed screen profile	FFP-40	MT45159N2000	148
	Covering cap	AK-16-40	Gray: MT48619	149
	Covering cap	AK-66-40	Gray: MT61163 Blue: MT61113	149

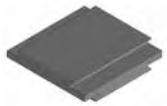
TRACSET COMPONENTS OVERVIEW

Figure	Description	Abbreviation	Part no.	Page
	Covering cap	AK-96-40	Gray: MT48618	149
	Clamping element longitudinal-longitudinal	SLL-55-40	MT65470	150
	Clamping element longitudinal-longitudinal	SLL-20-40	MT65464	150
	Clamping element longitudinal-longitudinal	SLL-12-40	MT65465	151
	Clamping element longitudinal-longitudinal	SLL-55/22-40	MT65466	151
	Clamping element longitudinal-longitudinal	SLL-20/22-40	MT65467	152
	Clamping element longitudinal round	SLR-15-40	MT65475	152
	Cross connector	KV-40	MT65474	153
	Corner connection	EV-3/45-40	MT65473	153
	Corner connection	EV-2-40	MT65502	154

TRACSET COMPONENTS OVERVIEW

Figure	Description	Abbreviation	Part no.	Page
	Corner connection	EV-3-40 (pack of 4)	MT65469	154
	Corner connection	EV-4-40 (pack of 4)	MT65471	155
	Corner connection	EVD-4-40	MT65472	155
	Clamping profile	SP-64D-40	MT41133N	156
	Front-side adapter	STA-40	MT57637	156
	Base angle	BW-40	MT45715N	157
	90° angle bracket	KW-40	MT45716N	157
	Adjusting bracket	EW-40	MT45851N	158
	Adjusting bracket, round	EWR-40	MT45852N	158
	Rotary disk	DS-0-40	MT40857N	159

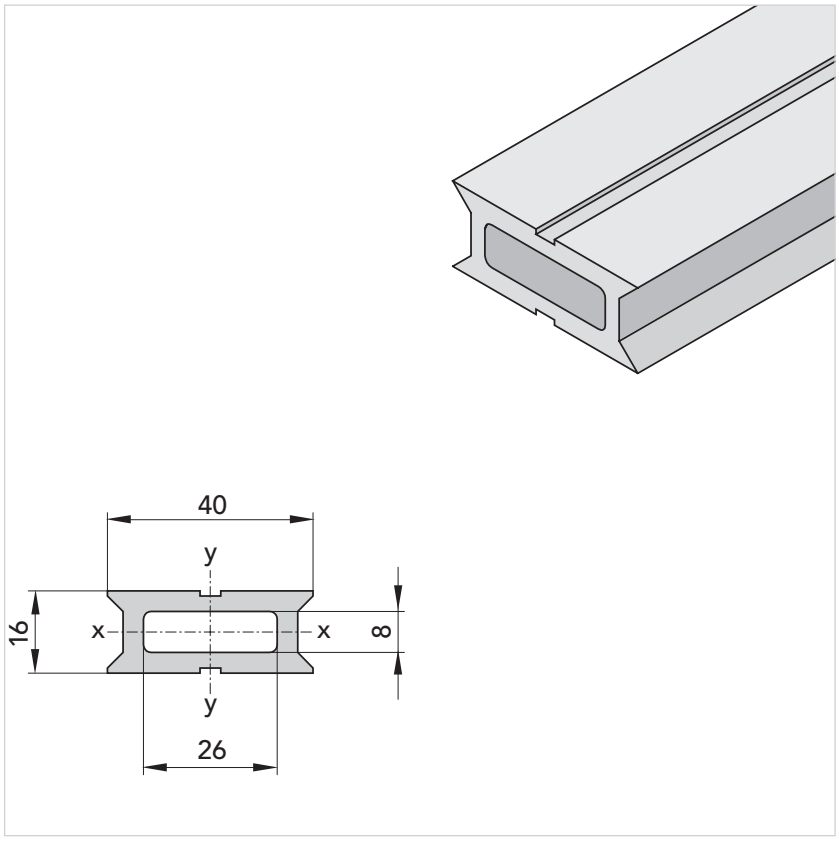
TRACSET COMPONENTS OVERVIEW

Figure	Description	Abbreviation	Part no.	Page
	Cross-element, reinforced	KEV-40	MT46199N	159
	Spacer element, long	DEL-40	MT57446	160
	Spacer element, short	DEK-40	MT57447	160
	Bracket for protective screen	HSS-40	MT48310N	161
	Hinge	S-40	MT45160N	161
	Articulated foot for support profile	GF-96-40	MT44019	162
	Articulated foot for support profile	GFTP-66-40	MT54295	162
	Articulated foot for light profile	GFLP-66-40	MT49397	162
	Swivel caster for support profile	LRTP-75-40	MT54267	163
	Swivel caster for light profile	LRLP-75-40	MT54269	163

TRACSET COMPONENTS OVERVIEW

Figure	Description	Abbreviation	Part no.	Page
	Fixed caster for support profile	BRTP-75-40	MT54268	164
	Fixed caster for light profile	BRLP-75-40	MT54270	164
	Foundation anchor bracket	FW-40	MT46201N	165

SUPPORT PROFILE TP-16-40

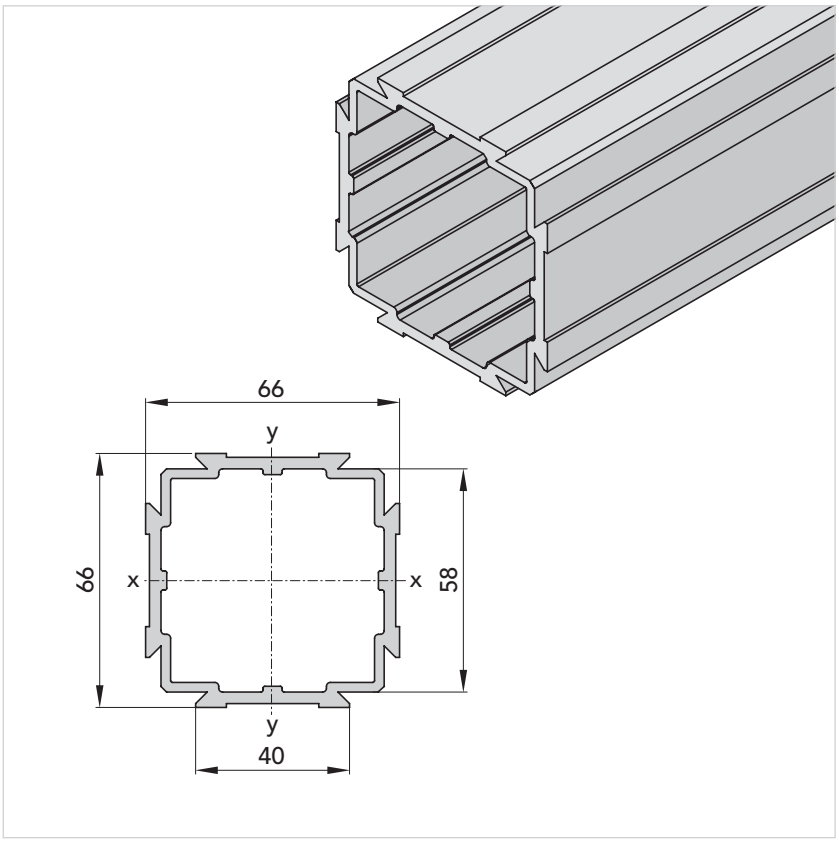


Precision aluminum rod extruded profile acc. to DIN 17615, hardened warm, anodized natural, end face cut nearly burr-free.

SUPPORT PROFILE TP-16-40 SPECIFICATIONS

Profile surface		[mm²]	368
Section modulus:	Wx	[cm³]	1.025
	Wy	[cm³]	1.640
Moment of inertia:	Jx	[cm⁴]	0.820
	Jy	[cm⁴]	3.280
Length tolerance			according to DIN 7168 medium
Torsion tolerance		[mm/m]	1
Straightness tolerance		[mm/m]	0.7
Weight		[kg/m]	0.980
Part no. for length = 2000 mm			MT44207N2000

LIGHT PROFILE LP-66-40

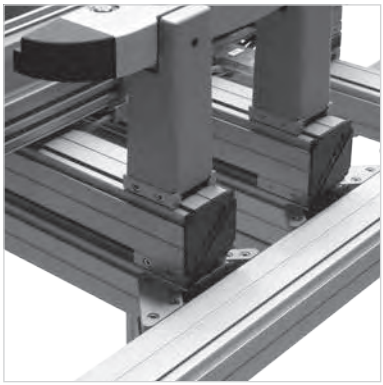


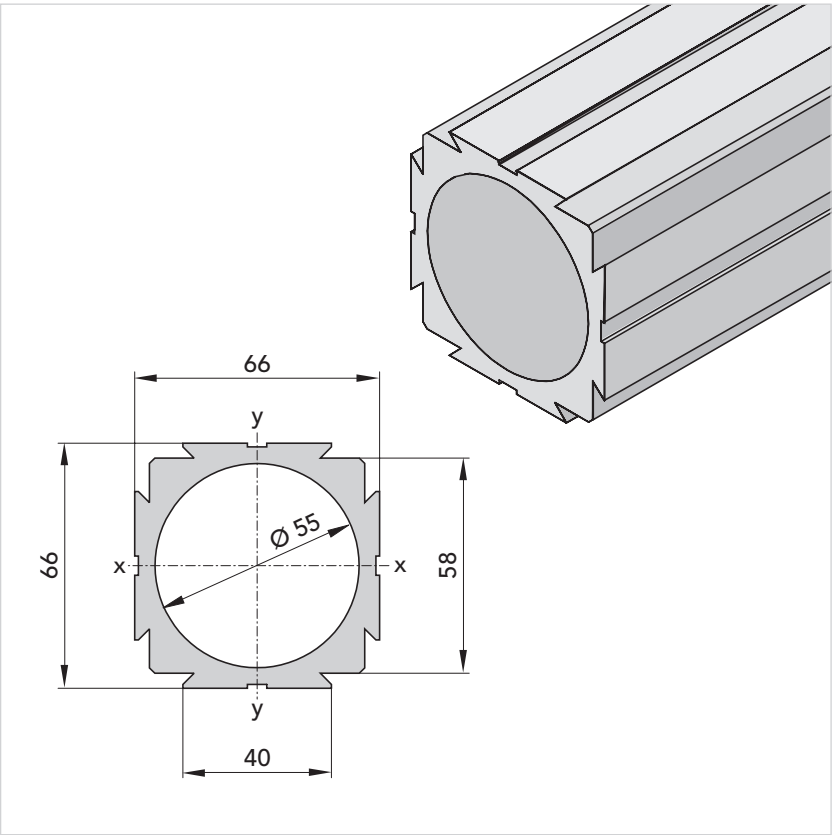
Precision aluminum rod extruded profile acc. to DIN 17615, hardened warm, anodized natural, end face cut nearly burr-free. Most suitable for base frames and superstructures which are not dynamically loaded.

LIGHT PROFILE LP-66-40 SPECIFICATIONS

Profile surface		[mm²]	809
Section modulus:	Wx	[cm³]	13
	Wy	[cm³]	13
Moment of inertia:	Jx	[cm⁴]	45
	Jy	[cm⁴]	45
Length tolerance			according to DIN 7168 medium
Torsion tolerance		[mm/m]	1
Straightness tolerance		[mm/m]	0.7
Weight		[kg/m]	2.186
Part no. for length = 3000 mm			MT49260N3000

SUPPORT PROFILE TP-66-40



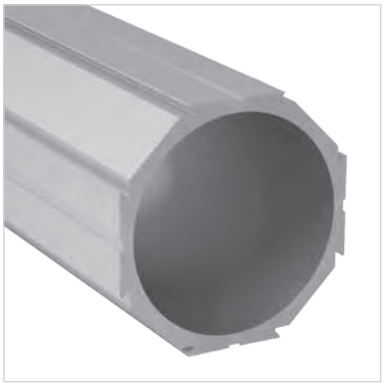


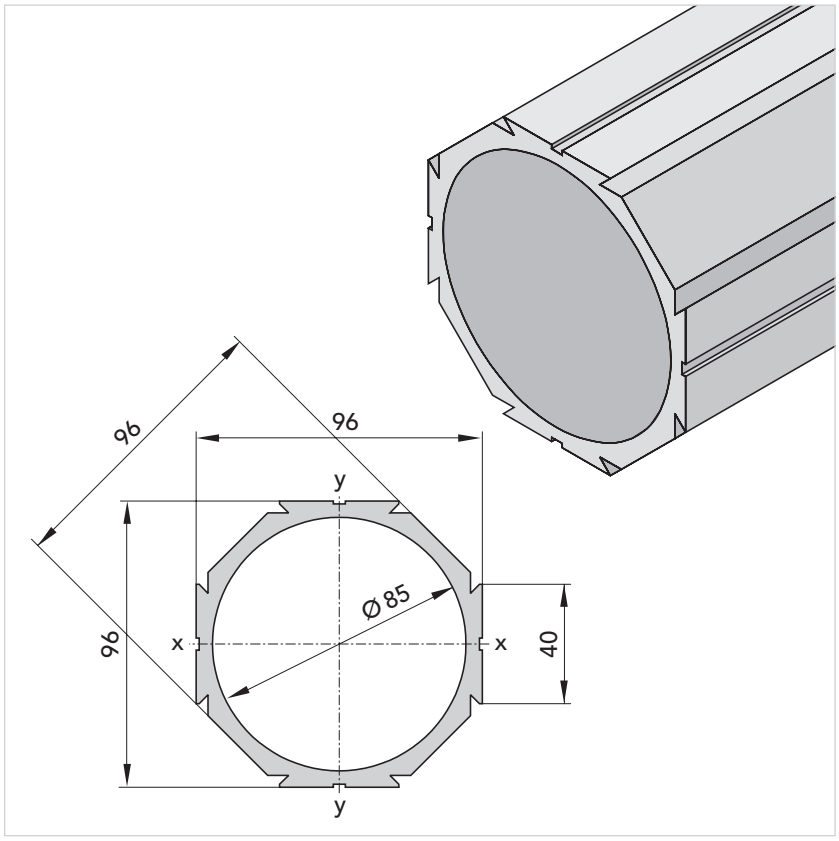
Precision aluminum rod extruded profile acc. to DIN 17615, hardened warm, anodized natural, end face cut nearly burr-free.

SUPPORT PROFILE TP-96-44 SPECIFICATIONS

Profile surface		[mm²]	1480
Section modulus:	Wx	[cm³]	23
	Wy	[cm³]	23
Moment of inertia:	Jx	[cm⁴]	76
	Jy	[cm⁴]	76
Length tolerance			according to DIN 7168 medium
Torsion tolerance		[mm/m]	1
Straightness tolerance		[mm/m]	0.7
Weight		[kg/m]	3.996
Part no. for length = 3000 mm			MT42852N3000

SUPPORT PROFILE TP-96-40



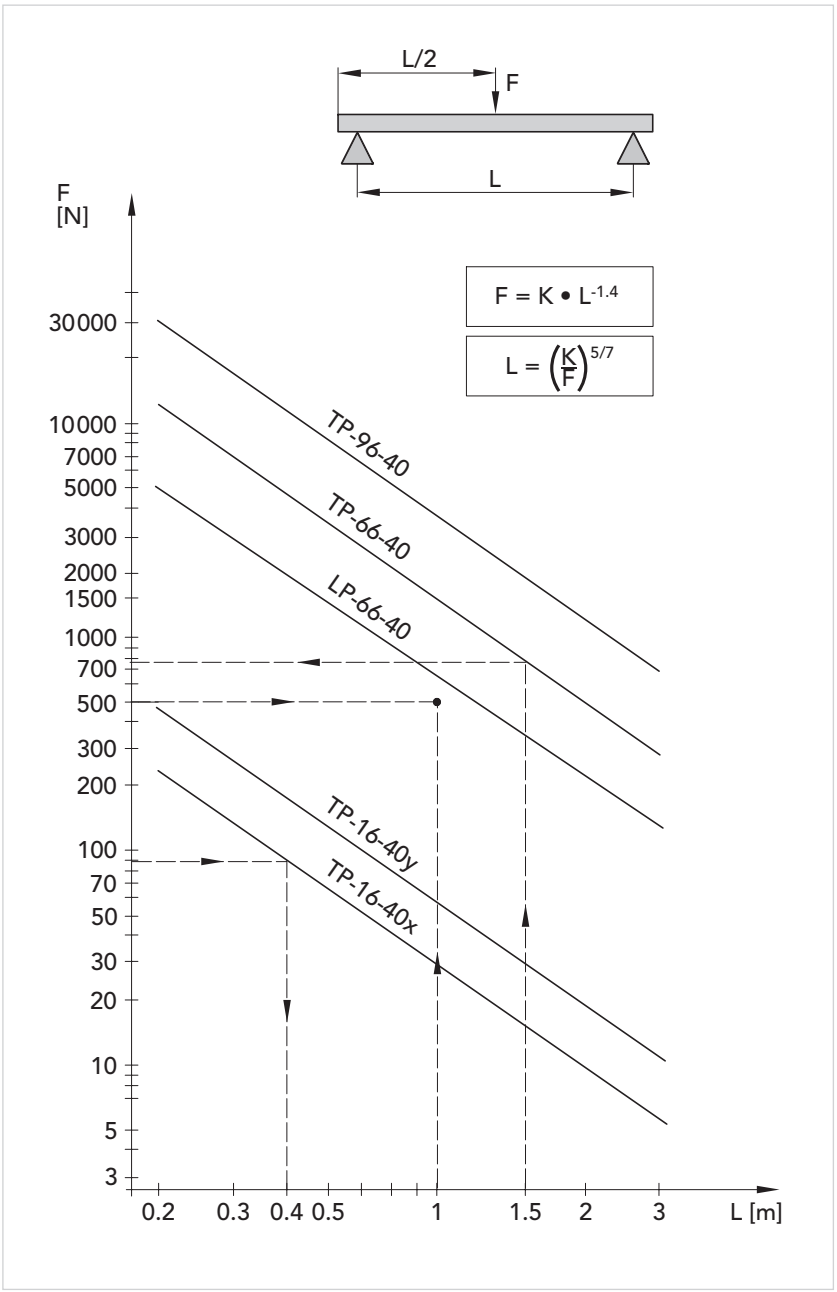


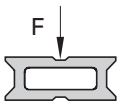
Precision aluminum rod extruded profile acc. to DIN 17615, hardened warm, anodized natural, end face cut nearly burr-free.

SUPPORT PROFILE TP-96-44 SPECIFICATIONS

Profile surface		[mm²]	1767
Section modulus:	Wx	[cm³]	37.82
	Wy	[cm³]	37.82
Moment of inertia:	Jx	[cm⁴]	181.53
	Jy	[cm⁴]	181.53
Length tolerance			according to DIN 7168 medium
Torsion tolerance		[mm/m]	1
Straightness tolerance		[mm/m]	0.7
Weight		[kg/m]	4.771
Part no. for length = 3000 mm			MT43207N3000

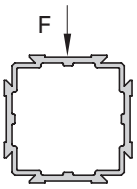
LOAD DIAGRAM



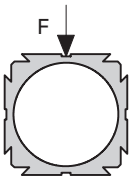


TP-16-40 x
K = 24.7

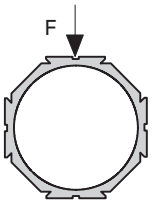
TP-16-40 y
K = 48.9



LP-66-40
K = 666



TP-66-40
K = 1302



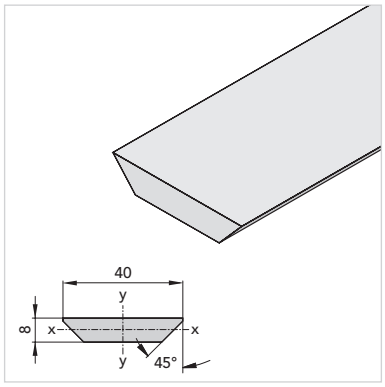
TP-96-40
K = 3146

Example 1
Given:
TP-66-40, L = 1.5 m
Result:
F_{max} = 738 N

Example 2
Given:
TP-16-40 x, F = 90 N
Result:
L_{max} = 0.4 m

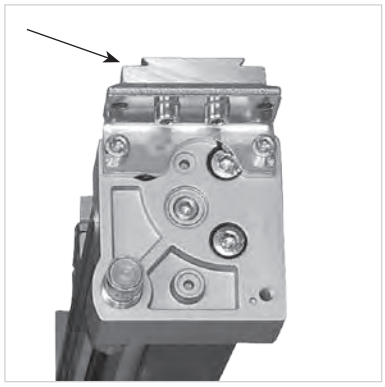
Example 3
Given:
L = 1 m, F = 500 N
Result:
LP-66-40 – Profile

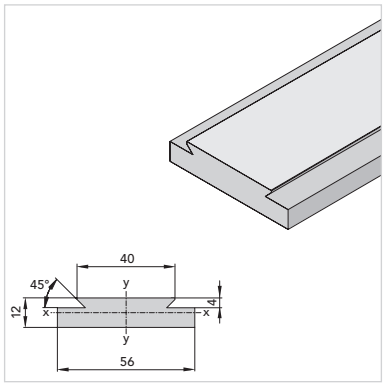
ADAPTER PROFILE AP-40-40



Precision aluminum rod extruded profile acc. to DIN 17615, hardened warm, anodized natural, end face cut nearly burr-free. Designed for the production of adapters.

ADAPTER PROFILE AP-56-40



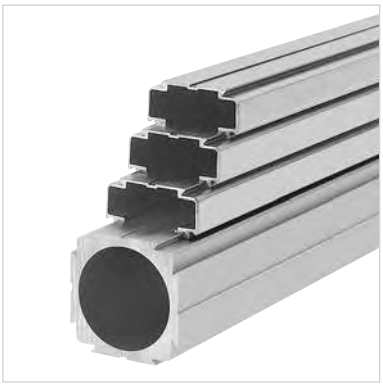


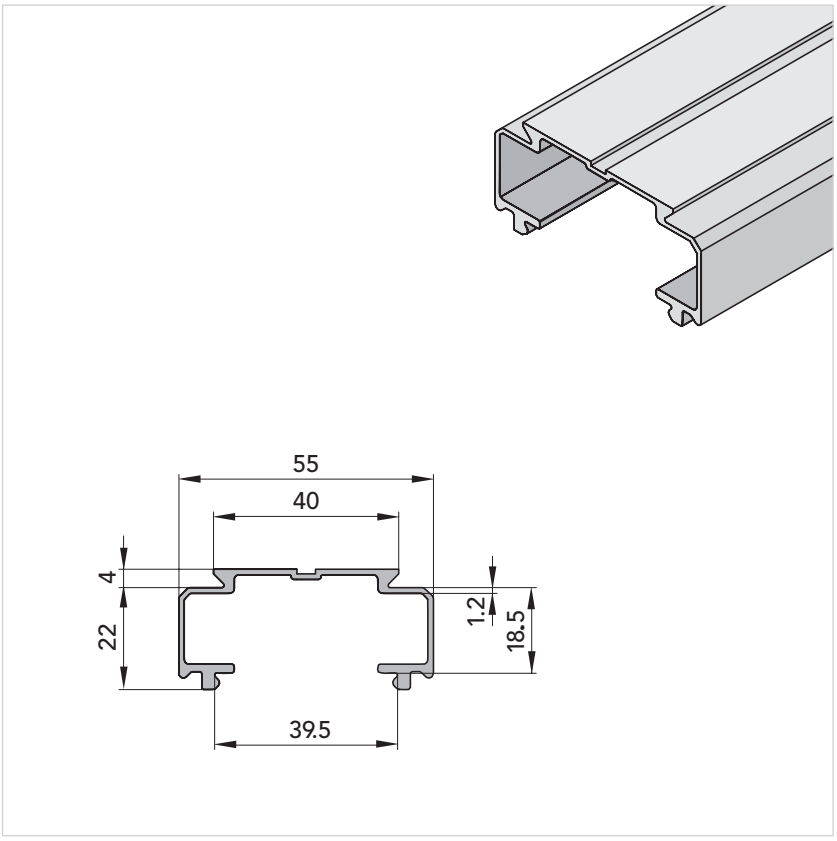
Precision aluminum rod extruded profile acc. to DIN 17615, hardened warm, anodized natural, end face cut nearly burr-free. Designed for the production of adapters.

ADAPTER PROFILE SPECIFICATIONS

			ADAPTER PROFILE AP-40-40	ADAPTER PROFILE AP-56-40
Profile surface		[mm²]	271	600
Section modulus:	Wx	[cm³]	0.32	1.04
	Wy	[cm³]	1.36	4.83
Moment of inertia:	Jx	[cm⁴]	0.14	0.67
	Jy	[cm⁴]	2.72	13.53
Length tolerance			according to DIN 7168 medium	according to DIN 7168 medium
Straightnesstolerance		[mm/m]	1	1
Straightness tolerance		[mm/m]	0.7	0.7
Weight		[kg/m]	0.732	1.620
Part no. for length = 2000 mm			MT41258N2000	MT46253N2000

MULTIPLE CABLE DUCT KFM-40



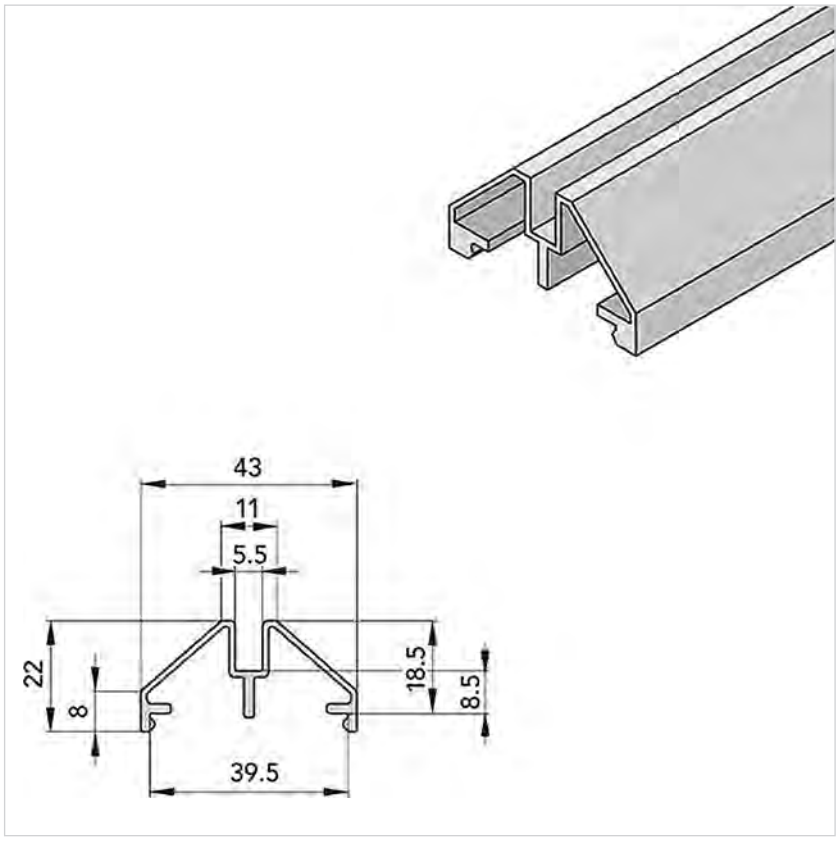


Precision aluminum rod extruded profile acc. to DIN 17615, hardened warm, anodized natural, end face cut nearly burr-free. Snapable profile for the laying of pneumatic hoses and electric cables.

MULTIPLE CABLE DUCT KFM-40 SPECIFICATIONS

Length tolerance		according to DIN 7168 medium
Weight	[kg/m]	0.549
Part no. for length = 2000 mm		MT45229N2000

FIXED SCREEN PROFILE FFP-40

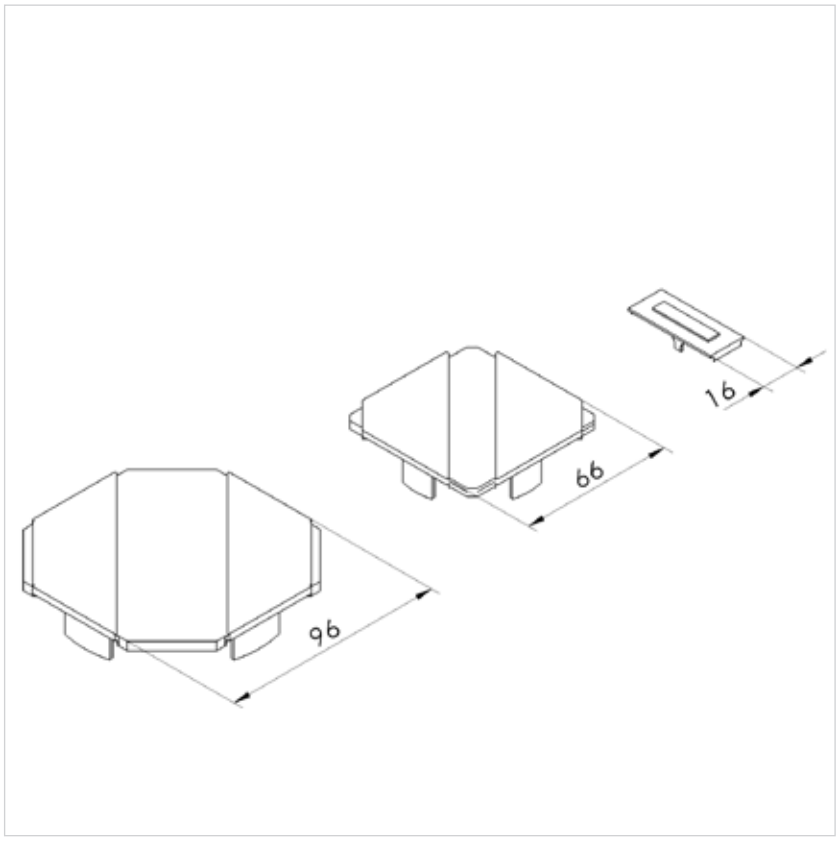


Precision aluminum rod extruded profile acc. to DIN 17615, anodized natural, end face cut nearly burr-free

FIXED SCREEN SPECIFICATIONS

Length Tolerance		according to DIN 7168 medium
Weight	[kg/m]	0.570
Part no. for length = 2000 mm		MT45159N2000

COVER CAP AK-16-40 / AK-66-40 / AK-96-40

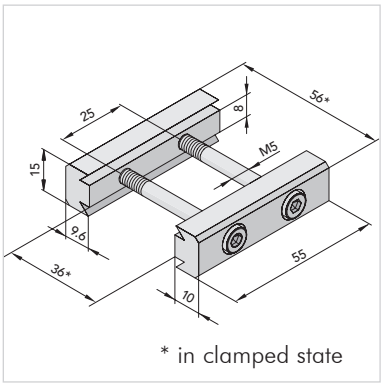


Lid of ABS plastic to close off the TP support profiles

COVER CAP AK-16-40 / AK-66-40 / AK-96-40

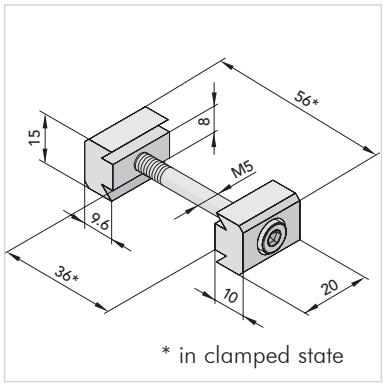
	gray	blue
Part no. for AK-16-40 for TP-16-40	MT48619	–
Part no. for AK-66-40 for TP-66-40 or LP-66-40	MT61163	MT61113
Part no. for AK-96-40 for TP-96-40	MT48618	–

CLAMPING ELEMENT LONGITUDINAL-LONGITUDINAL SLL-55-40



For connection of dovetail profiles under high load.

CLAMPING ELEMENT LONGITUDINAL-LONGITUDINAL SLL-20-40

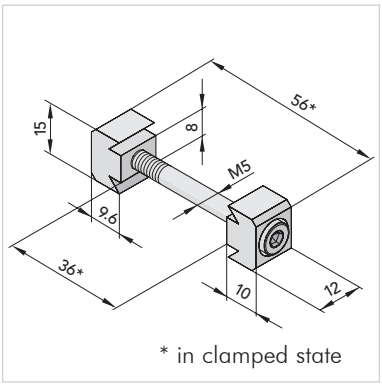


For connection of dovetail profiles under medium load.

CLAMPING ELEMENTS SPECIFICATIONS

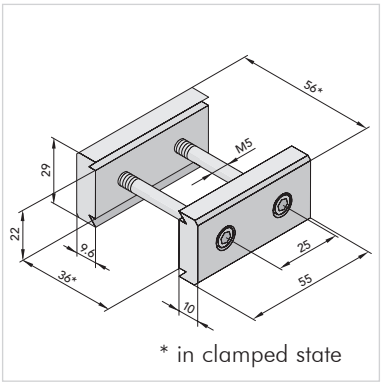
		CLAMPING ELEMENT LONGITUD.-LONGITUD. SLL-55-40	CLAMPING ELEMENT LONGITUD.-LONGITUD. SLL-20-40
Resistance to misalignment (of two joining profiles) [N]		3000	1350
Torque value of screw(s)	[Nm]	6	6
Parallelism of clamped surfaces	[mm]	± 0.02	± 0.02
Weight	[kg]	0.055	0.020
Part no.		MT65470	MT65464

CLAMPING ELEMENT LONGITUDINAL-LONGITUDINAL SLL-12-40



For connection of dovetail profiles under low load.

CLAMPING ELEMENT LONGITUD.-LONGITUD. SLL-55/22-40

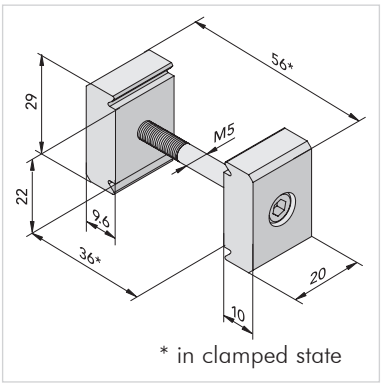


For the connection of dovetail profiles under high load and increased clearance.

CLAMPING ELEMENTS SPECIFICATIONS

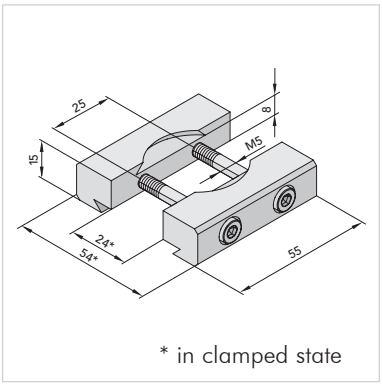
	CLAMPING ELEMENT LONGITUD.-LONGITUD. SLL-12-40	CLAMPING ELEMENT LONGITUD.-LONGITUD. SLL-5/22-40
Resistance to misalignment (of two joining profiles) [N]	750	3000
Torque value of screw(s) [Nm]	6	6
Parallelism of clamped surfaces [mm]	± 0.02	± 0.02
Weight [kg]	0,016	0,096
Part no.	MT65465	MT65466

CLAMPING ELEMENT LONGITUDINAL-LONGITUDINAL SLL-20/22-40



For the connection of outer dovetail profiles under medium load and increased clearance.

CLAMPING ELEMENT LONGITUDINAL-ROUND SLR-15-40

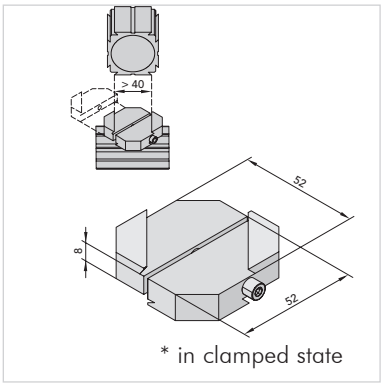


Connector between truncated cone and dovetail.

CLAMPING ELEMENT SPECIFICATIONS

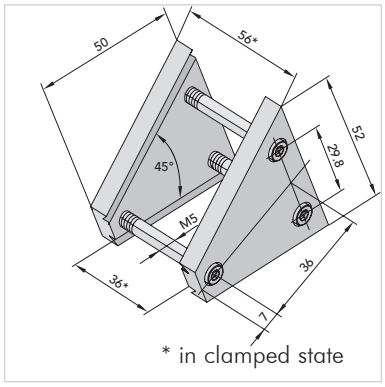
		CLAMPING ELEMENT LONGITUD.-LONGITUD. SLL-20/22-40	CLAMPING ELEMENT LONGITUDINAL-ROUND SLR-15-40
Resistance to misalignment	[N]	of two joining profiles 1350	3000
Torsional strength	[Nm]	–	90
Torque value of screw(s)	[Nm]	6	6
Parallelism	[mm]	of clamped surfaces ± 0.02	of the support surfaces ± 0.03
Weight	[kg]	0.022	0.070
Part no.		MT65467	MT65475

CROSS CONNECTOR KV-40



For connection of two dovetails intersecting at right angles.

CORNER CONNECTION EV-3/45-40

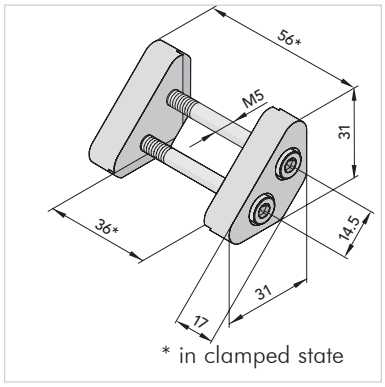


45° angle connector

CORNER CONNECTORS AND CROSS CONNECTORS SPECIFICATIONS

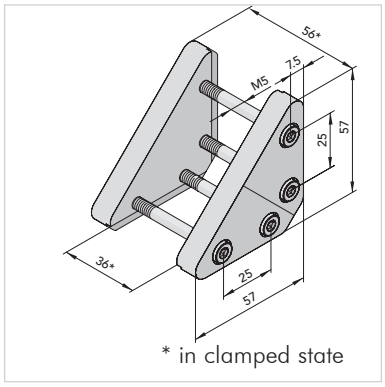
		CROSS CONNECTOR KV-40	CORNER CONNECTOR EV-3/45-40
Resistance to misalignment	[N]	1500	3000
Fastening torque of screw(s)	[Nm]	6	6
Weight	[kg]	0.060	0.1
Part no.		MT65474	MT65473

CORNER CONNECTOR EV-2-40



90° angle connector for low load.

CORNER CONNECTOR EV-3-40 (PACK OF 4)

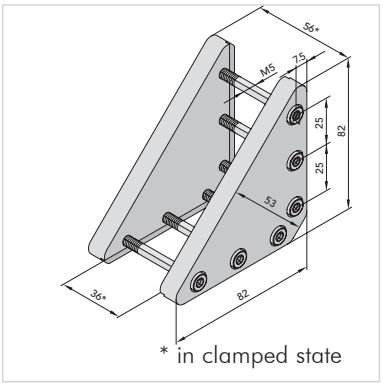


90° angle connector for medium load.

CORNER CONNECTOR SPECIFICATIONS

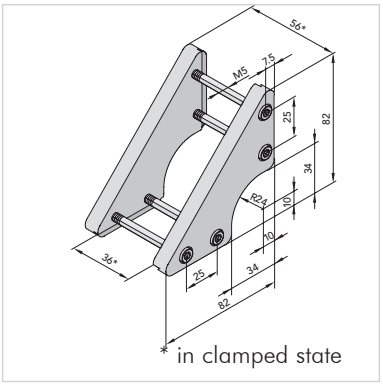
		CORNER CONNECTOR EV-2-40	CORNER CONNECTOR EV-3-40 (PACK OF 4)
Resistance to misalignment	[N]	1500	3000
Fastening torque of screws	[Nm]	6	6
Perpendicularity of clamping grooves	[mm]	± 0.02 (related to a length of 19 mm)	± 0.03 (related to a length of 45 mm)
Weight	[kg]	0.050	0.130
Part no.		MT65502	MT65469 (pack of 4 pre-assembled and packed)

CORNER CONNECTOR EV-4-40 (PACK OF 4)



90° angle connector for high load.

CORNER CONNECTOR EVD-4-40

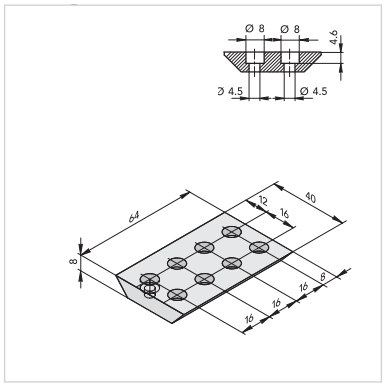


90° angle connector for medium load, with cable duct.

CORNER CONNECTOR SPECIFICATIONS

		CORNER CONNECTOR EV-4-40 (PACK OF 4)	CORNER CONNECTOR EVD-4-40
Resistance to misalignment	[N]	4500	3000
Fastening torque of screws	[Nm]	6	6
Perpendicularity of clamping grooves (related to a length of 70 mm)	[mm]	± 0.04 (related to a length of 70 mm)	± 0.04 (related to a length of 45 mm)
Weight	[kg]	0.250	0.200
Part no.		MT65471 (pack of 4 pre-assembled and packed)	MT65472

CLAMPING PROFILE SP-64D-40

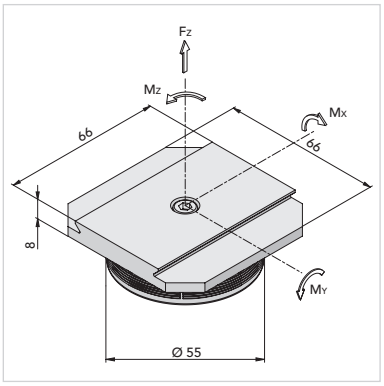


Adapter with double row hole pattern.

CLAMPING PROFILE SPECIFICATIONS

Weight	[kg]	0.040
Part no.		MT41133N

FRONT-SIDE ADAPTER STA-40

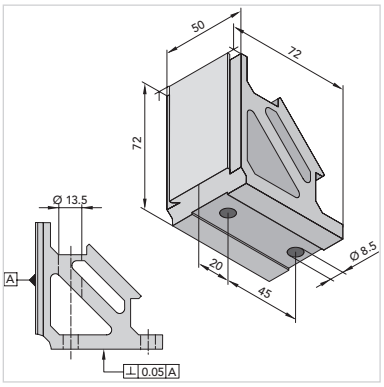


Dovetail profile for attachment on the face

FRONT-END ADAPTER SPECIFICATIONS

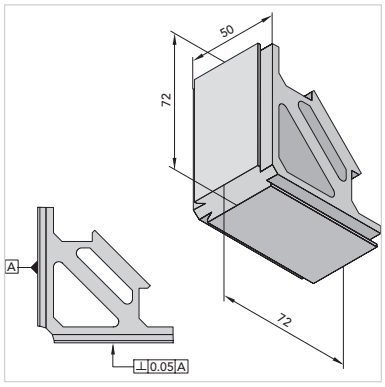
Mx perm. My perm. Mz perm.	[Nm] [Nm]	50 50 not admissible
Fz	[N]	900
Fastening torque of screw	[Nm]	6
Weight	[kg]	0.230
Part no.		MT57637

BASE ANGLE BW-40



For firm base connections on floors or on table boards.

90° ANGLE BRACKET KW-40

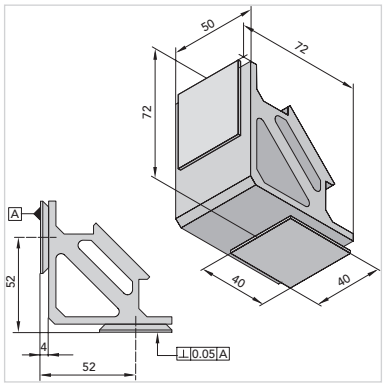


For the connection of two components arranged at right angles to each other and which can be individually adjusted.

BASE ANGLE AND ANGLE BRACKET SPECIFICATIONS

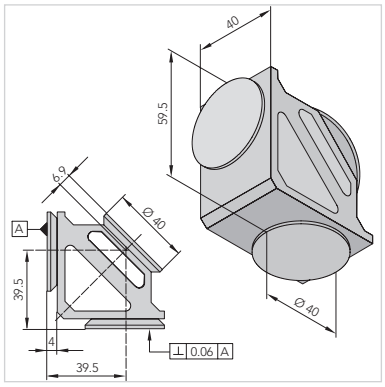
		BASE ANGLE BW-40	90° ANGLE BRACKET KW-40
Weight	[kg]	0.360	0.220
Part no.		MT45715N	MT45716N

ADJUSTING BRACKET EW-40



For the connection of two components arranged at right angles to each other and which can be individually fixed in two axis.

ADJUSTING BRACKET, ROUND, EWR-40

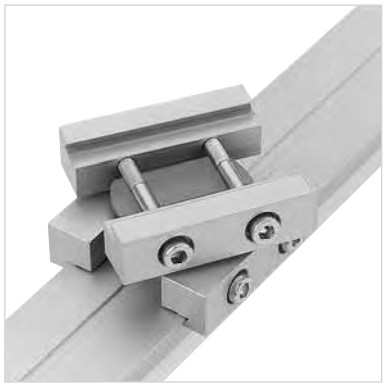


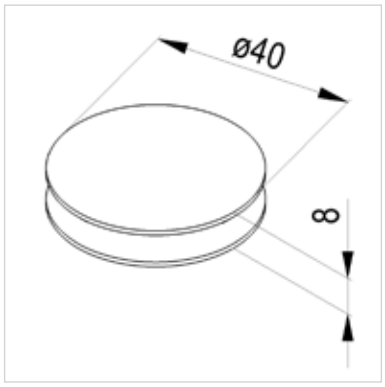
Adjusting bracket for angular joints

ADJUSTING BRACKET SPECIFICATIONS

		ADJUSTING BRACKET EW-40	ADJUSTING BRACKET, ROUND, EWR-40
Weight	[kg]	0.204	0.172
Part no.		MT45851N	MT45852N

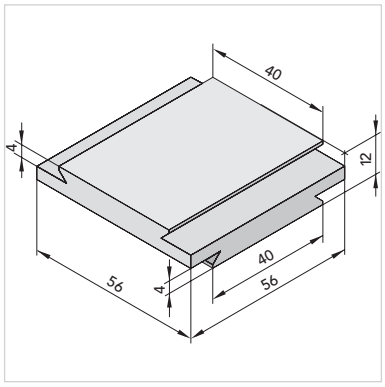
ROTARY DISK DS-0-40





For attachment of two dovetails opposing each other, which have to be arranged in any desired angle in twisted position to each other.

CROSS-ELEMENT REINFORCED KEV-40

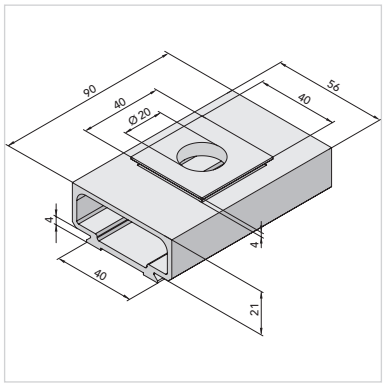


To connect two dovetails intersecting each other at right angles, under high loads.

ROTARY DISK AND CROSS-ELEMENT, REINFORCED SPECIFICATIONS

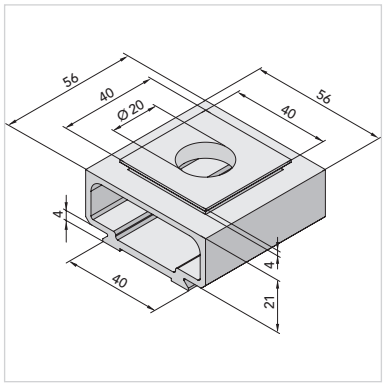
		ROTARY DISK DS-0-40	CROSS-ELEMENT REINFORCED KEV-40
Weight	[kg]	0.024	0.077
Part no.		MT40857N	MT46199N

SPACER ELEMENT, LONG DEL-40



For connection of dovetail profiles under medium load.

SPACER ELEMENT SHORT DEK-40

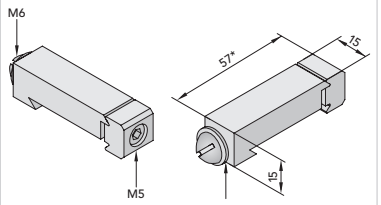


For the connection of outer dovetails under medium load.

SPACER ELEMENT SPECIFICATIONS

		SPACER ELEMENT LONG DEL-40	SPACER ELEMENT SHORT DEK-40
Weight	[kg]	0.110	0.080
Part no.		MT57446	MT57447

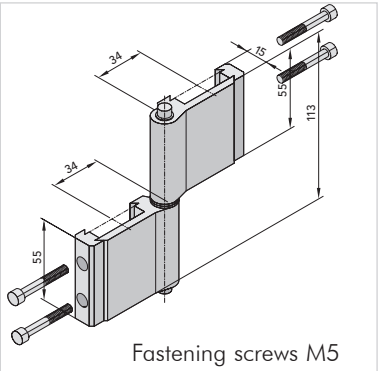
BRACKET FOR PROTECTIVE SCREEN HSS-40



Hole diameter 8 mm
(protective screen)

* in clamped state

HINGE S-40



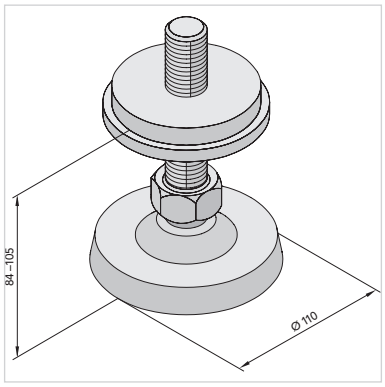
Fastening screws M5

Hinge of aluminum, anodized natural, for swing doors.

SPECIFICATIONS BRACKET FOR PROTECTIVE SCREEN AND HINGE

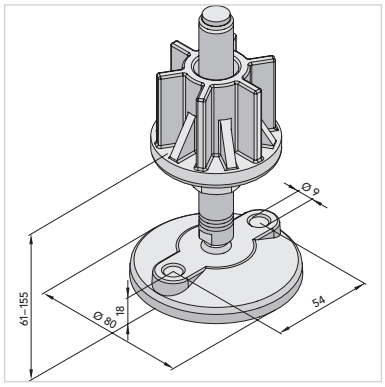
		BRACKET FOR PROTECTIVE SCREEN HSS-40	HINGE S-40
Weight	[kg]	0.034	0.300
Part no.		MT48310N	MT45160N

ARTICULATED FOOT GF-96-40 FOR SUPPORT PROFILE TP-96-40



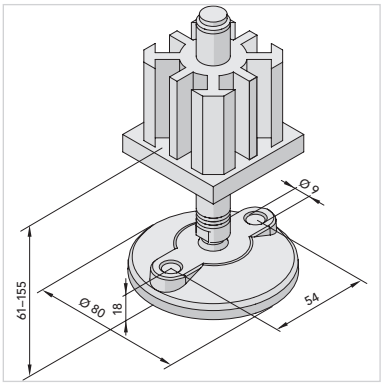
Foot made of black plastic with vibration absorber, spindle of steel, galvanized with corresponding adapter for profile TP-96-40.

ARTICULATED FOOT GFTP-66-40 FOR SUPPORT PROFILE TP-66-40



Foot made of black plastic with vibration absorber, spindle of steel, galvanized with corresponding adapter for profile TP-66-40.

ARTICULATED FOOT GFLP-66-40 FOR LIGHT PROFILE LP-66-40



Foot made of black plastic with vibration absorber, spindle of steel, galvanized with corresponding adapter for profile LP-66-40.

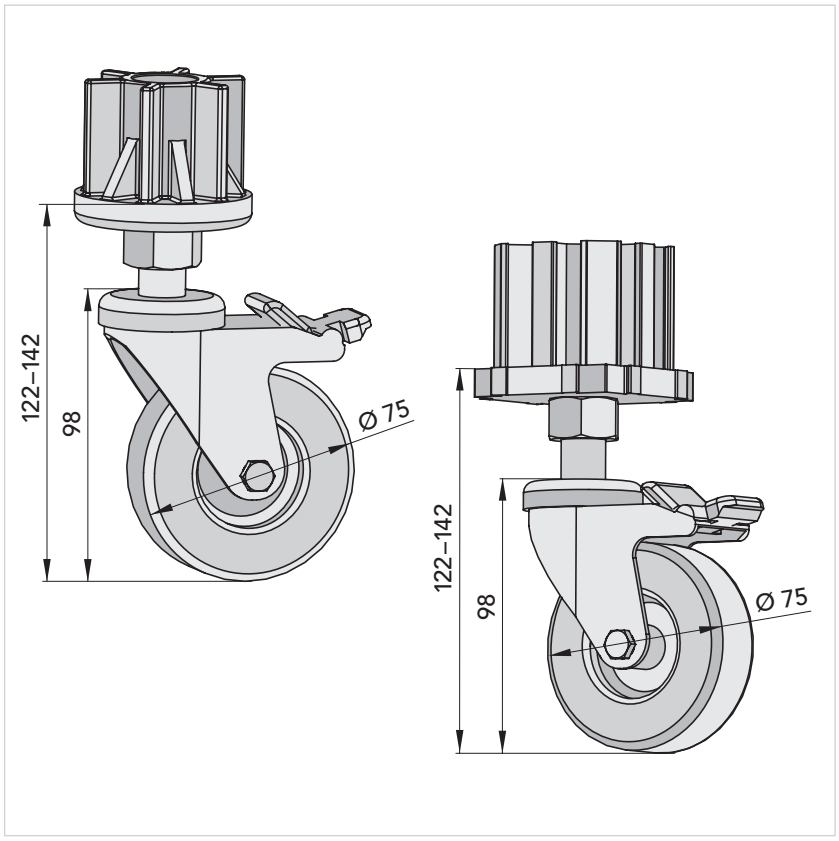
ARTICULATED FOOT SPECIFICATIONS

		ARTICULATED FOOT GF-96-40 FOR SUPPORT PROFILE TP-96-40	ARTICULATED FOOT GFTP-66-40 FOR SUPPORT PROFILE TP-66-40	ARTICULATED FOOT GFLP-66-40 FOR LIGHT PROFILE LP-66-40
Max. load in axial direction	[kN]	12	5	5
Weight	[kg]	0.865	0.350	0.400
Part no.		MT44019	MT54295	MT49397

SWIVEL CASTER LRTP-75-40 / LRLP-75-40

Swivel caster for support profile.

Swivel caster for light profile.



Fixed casters each with corresponding adapter

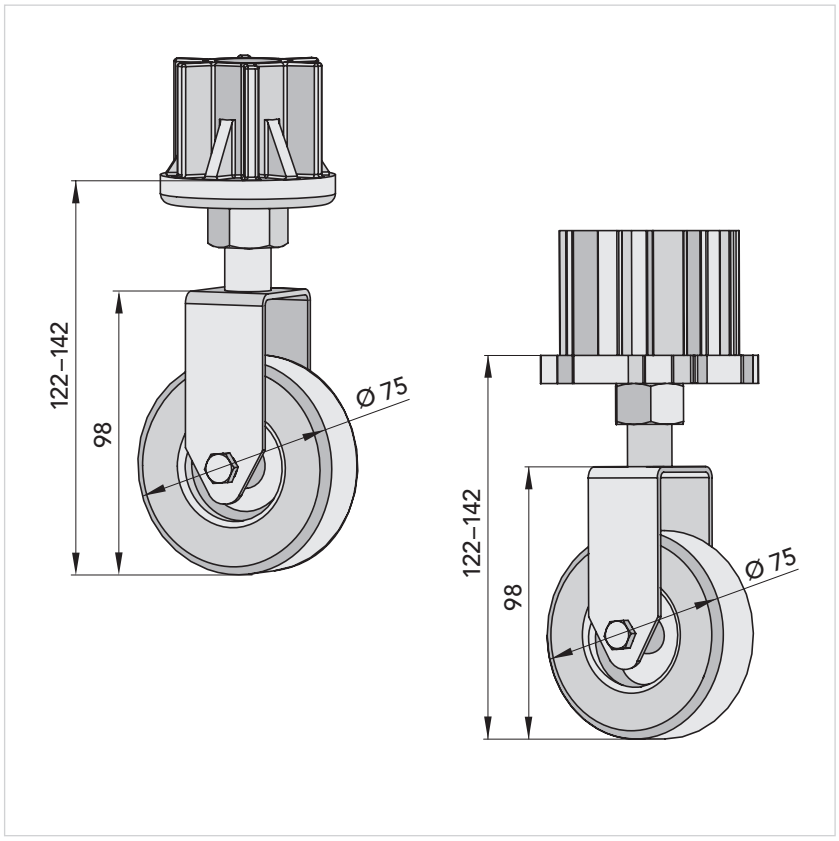
CASTER SPECIFICATIONS

		SWIVEL CASTER LRTP-75-40 FOR SUPPORT PROFILE TP-66-40	SWIVEL CASTER LRTP-75-40 FOR LIGHT PROFILE TP-66-40
Max. load in axial direction	[N]	580	580
Weight	[kg]	0,465	0.510
Part no.		MT54267	MT54269

FIXED CASTER BRTP-75-40 / BRLP-75-40

Fixed caster for support profile.

Fixed caster for light profile.

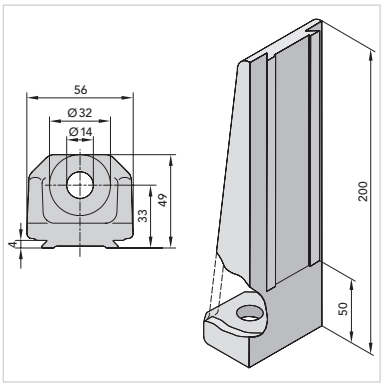


Fixed casters each with corresponding adapter.

FIXED CASTER SPECIFICATIONS

		FIXED CASTER BRTP-75-40 FORSUPPORT PROFILE TP-66-40	FIXED CASTER BRLP-75-40 FOR LIGHT PROFILE LP-66-40
Max. load in axial direction	[N]	580	580
Weight	[kg]	0,375	0.420
Part no.		MT54268	MT54270

FOUNDATION ANCHOR BRACKET FW-40



For floor attachments and connections with constructions incompatible with TracSet - made of cast aluminum.

FOUNDATION ANCHOR BRACKET SPECIFICATIONS

Perpendicularity between base surface and Dovetail, in relation to the flank length 49 mm	[mm]	± 0.1
Weight	[kg]	0.440
Part no.		MT46201N

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SCHMID Group | montratec AG
Zielmattenring 6 | 4563 Gerlafingen | Switzerland | Phone:
Phone +41 32 55 88 700 | Fax +41 32 55 88 799
info.montrac@schmid-group.com | www.schmid-group.com